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See Editorial Note

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STATES

# *Armed Forces Medical Journal*

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# Monthly Message

In the next four Messages we will consider briefly four items of common interest to the medical profession, two of which affect the civilian economy. The first two—(1) medical and dental personnel and (2) the MFND Program—were of grave concern and much in the public eye in 1954. (3) the Interdepartmental Committee on Nutrition for National Defense (ICNND) and (4) the Joint Committee on Aviation Pathology have since come into being and have made extraordinary progress.

Five years ago the problem of medical and dental officer personnel for the armed services was acute. Three agencies had various prerogatives of control. The Selective Service System, the Health Resources Advisory Committee, and the Assistant Secretary of Defense (Health and Medical) in collaboration with the Assistant Secretary of Defense (Manpower, Personnel and Reserve). Approximately 90 percent of our medical graduates had already fulfilled their military obligation either in World War II or subsequently. From 1946 to 1950 our medical schools increased both in number and in their graduating classes. From 1950 to 1954 because of the Korean conflict it was necessary to draft 4,000 and 2,700 physicians in alternate years. This required that many in the Reserve be called upon for extra periods of service. Those who had acquired their medical education at the expense of the Government or had previously been declared essential were reviewed many or called oftentimes with much wailing at the wall.

With the cooperation of Selective Service, the Advisory Committee and the Military: (1) the Armed Forces Reserve Medical Officer Commissioning and Residency Consideration Program (Berry Plan) and (2) Summer Medical and Dental Student Programs were initiated. The Berry Plan provided that student be commissioned during their final year in medical and dental schools as second lieutenants with full pay and allowances in return these graduates were obligated for an extra year of service beyond the usual 2 years. (3) The residency program of the armed services has also been important. The program together with the increasing number of graduates who had fulfilled military requirements has brought about that improvement. Resulting in sufficient dental officers for the past 4 years and non-formal medical officers for the past 3 years. In all there be a draft for all in the coming year. The armed services will fill this program approximately 1,000 medical officers during the form peak and valleys have been appeared.

# ontents

ARMED FORCES MEDICAL JOURNAL • VOL 11 • JANUARY 1960

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## Foreword

The *United States Armed Forces Medical Journal* is a monthly publication of professional and administrative information for medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the United States Army, Navy, and Air Force invite members of the regular and reserve medical service, the professional consultant of the military department, and other physicians and health scientists with an interest in Department of Defense activities to submit manuscripts for publication in this *Journal*.

FRANK B. BERRY, M.D.

*Assistant Secretary of Defense*

LIEUTENANT GENERAL LEONARD D. HEATON

*Surgeon General United States Army*

REAR ADMIRAL BARTHOLOMEW W. HOGAN

*Surgeon General United States Navy*

MAJOR GENERAL OLIVER K. NICHOLS

*Surgeon General United States Air Force*

## PORTRAIT OF PRESIDENT EISENHOWER

The portrait of President Eisenhower was painted by Thomas E. Sweeney, one of America's foremost portraitists, and hangs in the White House Gallery on the second floor. Completed in the fall of 1953, it is the most recent of several portraits of the President by this artist.

In Sweeney has painted portraits of many outstanding leaders of America: the five war-time Presidents of the United States, of the Supreme Court of the United States, and many other distinguished Government officials. The photograph on the opposite page of the President was taken for the 100th anniversary number of the United States Armed Forces Journal, issued to the staff of the General Headquarters Service of the United States Institute of Technology.



## Foreword

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*Surgeon General United States Navy*

MAJOR GENERAL OLIVER K. NILES

*Surgeon General United States Air Force*

## PORTRAIT OF PRESIDENT ELIOT

This portrait of President Eliot was prepared by  
 Stephen C. Brown of America's foremost portrait painter and is  
 Union League Club of New York. Completed in 1911, it  
 is the most recent of several portraits of the President by the same  
 Mr. Stephens has painted portraits of many outstanding figures  
 and try the first in General Officers of the Army, including  
 General John A. Dyer and Arthur Hays Sulzberger, and  
 Government officials. The photograph of the portrait of the President  
 was made for the United States Army and Navy  
 Forces Medal Journal by the staff of the Marine Department  
 of the Army and Force of the United States Army.





Dear Colonel Benford

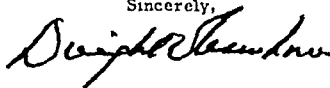
It is a pleasure to  
Anniversary of the  
Medical Journal.

Over the years military  
Nation well. It has provided  
medical service in its  
bility and it has made  
whole knowledge of disease

Through cooperative effort, the  
civilian and military alike, has  
precedented level of good health  
medical personnel have played  
an indispensable role in this  
part in the achievements of the  
delighted to salute the United States  
Medical Journal

With best wishes,

Sincerely,



Colonel Robert J Benford USAF, MC  
Editor  
U S Armed Forces Medical Journal  
Washington D C

# Army Medicine Past, Present, Future

LIEUTENANT GENERAL LEONARD D. HEATON  
SURGEON GENERAL UNITED STATES ARMY

IT IS AN HONOR AND A DISTINCT PRIVILEGE to contribute to the tenth anniversary issue of the *United States Armed Forces Medical Journal*. As successor to the *Bulletin of the U. S. Army Medical Department* and the *United States Armed Medical Bulletin*, this periodical has provided an excellent platform for the exchange of valuable professional information and ideas among the personnel of the military medical services. On behalf of the U. S. Army Medical Service, I extend congratulations on the occasion of this birthday and sincere best wishes for continued success.

The decade that has passed since the first edition of the *Journal* was published has been an unusually eventful one. Among the many momentous developments and events that have had a profound impact upon military medicine in addition to progress made in integrating the planning of the medical services have been the



Korean conflict and the communist controlled war in North Vietnam. The Treaty Organization, the changing concepts of warfare in the atomic age, intercontinental ballistic missiles, and more recently the hit and miss of living organisms marking what might appropriately be called a prelude to space medicine. In the field of legislation we have had such vital measures as the Doctor Draft, the Dependents Medical Care Act, and the Medical and Dental Officers Career Incentive Act of 1960. During this off-peak operation in the Army

## ARMY MEDICINE PAST PRESENT FUTURE

Medical Service have been the establishment of the Office of the Deputy Chief of Staff for Logistics the single manager system for medical materiel the US Continental Army Command and the Army Command Management System of which the Hospital Command Management System is a part

We are proud of the achievements of the Army Medical Service during these 10 turbulent years just as we are proud of the progress made over the 184 years since its origin The problems we face in this infant nuclear age and those we shall face during the next 10 years will grow in scope and intensity but I am confident that in line with the tradition of the Army Medical Service we will face up to these problems and successfully resolve them

To accomplish our mission of conserving fighting strength and preparing for mobilization in the event of war we must move forward on a broad front As I stated previously and will continue to emphasize success in meeting our grave responsibilities to the Nation rests on a broad objectives—I call them the 5 pillars of military medicine (1) the practice of medicine including the art of medicine as well as curative and preventive medicine (2) field medicine or combat readiness (3) medical education and training (4) medical research and development (5) medical administration and management I firmly believe that true progress can be achieved only by working to attain the highest degree of perfection in all of these objectives and by simultaneous improvement in every facet of our operations Our goal which embraces each of these essential areas is the practice of total medicine Faced with the complexities of modern weapons systems and the ultrasophisticated weaponry yet to come we dare not lose sight of the brief yet immortal words of Alexander Pope

The proper study of mankind is man

We of the military medical services need to make certain that man—the ultimate weapon—is never subordinated to his environment or to a system As we move into space the depths of the ocean or the bowels of the earth we must have the knowledge necessary to enable man to maintain his superiority over his environment In this respect the practice of total medicine can recognize no artificial barriers no limitations that would serve to restrict or restrict of either man or his ultimate environment

Furthermore our concern and interest in the health of the soldier and the system and environment within which he operates carry a broad responsibility for an equal interest in the health of his family During the 10 years in which the Army Medical Service we have become aware that we are no longer dealing with a man in uniform We are dealing with family and community

War II both the number of families in the service and the size of individual families have constantly increased and the upward trend in the ratio of dependents to military personnel now with us shows no sign of turning downward in the foreseeable future. We must never overlook this fact in our planning.



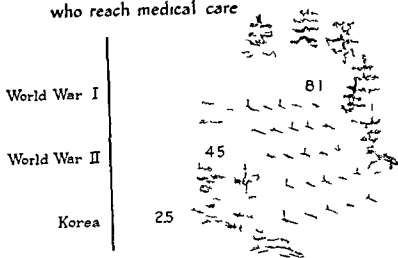
On the anniversary of the signing of the Armistice, we are reminded of the fact that the war has been over for a long time. The fact that the war has been over for a long time is a fact that we should not forget.

An anniversary such as this should not be minimized. It gives us an opportunity to look into the future, but it also carries with it an equal requisite to review the past. We stand where we are to lay on the basis of what we have accomplished in the past. Our accomplishments in the future will in large measure depend upon how well we build on the present. A comprehensive review of the notable accomplishments of the Army Medical Service over even the brief span of a year or two is impossible in this space. I think it well to note, however, the Army medicine highlight of the past decade and to take a glimpse into the future.

## ARMY MEDICINE PAST PRESENT FUTURE

One outstanding accomplishment has been the improvement in the quality and professional stature of individuals in all the corps which comprise the Army Medical Service. The basic reason for this improvement is our professional education and training program.

### Death Rate of Wounded who reach medical care



We stand where we are today on the basis of what we have accomplished in the past. Our accomplishment in the future will not generate help upon how we will stand on the present.

This program was aggressively supported and carefully nurtured by Major General Raymond W. Bliss, MC USA (Ret), surgeon general of the Army at the time the *Journal* came into being. In the years immediately following World War II the Army Medical Service was faced with the formidable task of rebuilding. Many believed that we had made a serious error during the war in trying to turn all of our career medical officers into administrators. The surgeon general was convinced that the Army Medical Service could not perform its peacetime mission nor prepare for war effectively without sending many of our medical officers to civilian institutions for postgraduate study. Keenly aware of the trend toward greater specialization in medicine, General Bliss and his staff realized that if the Army were to attract qualified young physicians and dentists to careers in military medicine, it would have to provide them with the opportunity to continue their professional education in the service.

Consequently during this early period of the *Journal's* history the carefully fostered postgraduate training program became a permanent part of the military medical establishment. This abrupt turn in military medicine came at an opportune time. Within a few years war was suddenly thrust upon us in Korea and our residents constituted the only source of quickly available medical officers. Within a matter of days more than 230 residents had been flown to the Far East where they served with distinction until we were able to expand our medical resources sufficiently to permit them to return to their training.



The improvement in the quality of our professional work will not link

It was also during this period of the *Journal's* early history that the urgency for closer ties between military and civilian medicine was foreseen and the extensive program for utilizing civilian consultants to assist in the training of our young physicians was developed. The contributions of these civilian consultants toward improving patient care and raising our professional standards have been of immeasurable benefit to the Army. At the same time a steady increase in stature and value to the Army Medical Service of our other officers—dentists, nurses, veterinarians, the officers of the Medical Service Corps and members of the Medical Specialist Corps—has resulted from the greater emphasis placed upon advanced education and training.

The improvement in the quality of our professional care was effectively demonstrated in Korea. The excellence of the Army's

## ARMY MEDICINE PAST PRESENT FUTURE

medical performance there has been attested so often that it need not be repeated here. Each successive year since the Korean conflict—except for a slight setback in fiscal year 1958 when we had the bout with Asian influenza—we have been able to boast of the healthiest Army in our recorded history. The noneffective rate among our troops has been constantly shrinking. We have recognized and have taken action to meet the urgent need for improving the practice of the art as well as the science of medicine. Patients in Army hospitals receive professional care equal to the best in civilian medicine. In the worldwide system of Army hospitals not a single hospital considered for accreditation by the Joint Commission on Accreditation of Hospitals has failed to receive it.

It is in the construction program that we are lagging behind in the care of our patients today. Of the 31 Army hospitals operating in the continental United States 17 either have been recently replaced or are in various stages of replacement from design to actual construction. Of the others 25 need to be replaced as soon as possible. Similarly we need rapid replacement of other medical facilities such as Army area laboratories, dental clinics, dispensaries, nurses quarters, and enlisted men's barracks. Only 2 modern dental clinics have been constructed since World War II. Other things being equal the most scientific and efficient medical care is given in modern facilities and I intend to pursue energetically all elements of the construction program to assure a proper modern environment for the care and treatment of patients.

There are many areas in which the Army Medical Service is doing a splendid job today but we are exerting increased efforts to do a better job tomorrow. Our capability to perform cardiac catheterization and open heart surgery is being rapidly expanded. Isotope clinics and pulmonary physiology testing are being made available in more and more Army treatment facilities. An aggressive program is being conducted to strengthen and modernize outpatient facilities in keeping with changing concepts of medical care. Army psychiatrists have made notable advances in strengthening and expanding preventive measures that have sharply reduced noneffectiveness resulting from psychologic reasons. We are further expanding education and training programs in view of our developments and requirements both in professional and strictly military fields.

The Department of the Army is developing a peacetime whole blood program that will encompass blood processing from collection point to patient organized so as to allow rapid expansion to meet current operational needs or to cope with any emergency that might arise. In an effort to raise our nursing standard a department of nursing



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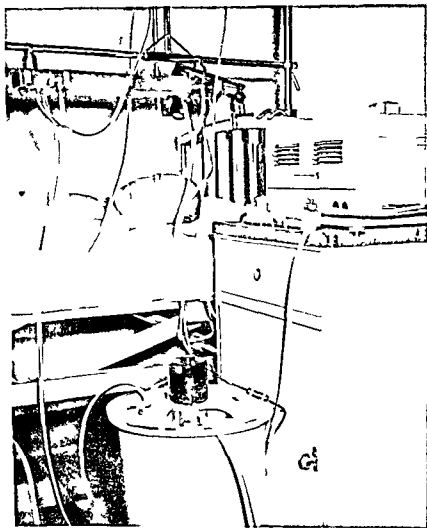


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1958 of the U S Army Medical Research and Development Command. Last year we collaborated with the Navy in a project concerning bio medical aspects of missile transport which resulted in a historic achievement—the successful flight of monkeys into space. Within the past few years Army researchers have made significant advances in many other fields including research on burns and on the use of



For our early program, the development and improvement of the artificial kidney

chloramphenicol and other broad spectrum antibiotics in treating typhus, fevers, other rickettsial diseases, and influenza. In 1957 Dr. Maurice Hilleman and his associates at Walter Reed Army Institute of Research succeeded in isolating a new strain of influenza virus from

specimens collected in the Far East which enabled manufacturers to develop an effective new vaccine before the Asian influenza pandemic reached America. From our research programs have come better methods for early diagnosis of infectious disease, the development and improvement of the artificial kidney, the jet injection gun which provides a safe, painless and fast method of immunization in mass inoculation programs, and the first really effective method of artificial respiration, the mouth to mouth method. In dental research the development in 1938 of the jet injection method of local anesthesia represented the first basic change in injection technique in the history of dentistry.

We in the Army Medical Service feel that during these past 10 years we have come a long way toward our goal of better military medicine. As we look back today we realize with astonishment that many of the dreams and aspirations of a decade ago have become realities. In the fast moving world in which we now live no one can foresee what the next 10 years will bring. I am sure that when the *Journal* celebrates its twentieth anniversary great progress will have been made toward the realm of what we consider today to be mere science fiction.

# THE SOCIAL CLIMATE OF EPIDEMIOLOGY

B u e f t l h a g n g b u t u I f i d t d f f l t t  
s l o r l d t h t d d m l d j t m t T l a t o m  
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—T F n e r J a T h E p d e l g l A p p r h t  
H m F c o l g T h i m J l f t h M d c l S c  
J 1959

# Naval Medicine A Decade of Progress

REAR ADMIRAL BARTHOLOMEW W. HOGAN  
SURGEON GENERAL UNITED STATES NAVY

CONGRATULATIONS are due on this tenth anniversary of the establishment of the *United States Armed Forces Medical Journal* as a joint publication of the Army, Navy, and Air Force. From its inception the *Journal* served as an outstandingly effective medium for disseminating professional information to medical and dental personnel of the armed services, and over the years there has been a continuous trend toward ever higher quality in the content and format of the material presented.

This splendid record is a gratifying demonstration of the efficiency and economy resulting from tri-service cooperation under the policy-making guidance and coordination of the Office of the Assistant Secretary of Defense (Health and Medical). Editors and contributors representing every branch of the Armed Forces have made joint use of facilities provided by the Navy as management agent working to-

gether in complete harmony to render an important service to all three of the armed services. In no other way, with a modest expenditure of money and manpower, could so much timely and valuable information have been made available to all medical department personnel wherever they were stationed in any part of the world.

Throughout the decade that has seen the *Journal* achieve its present high status, the Medical Department of the Navy made continual and at times very rapid progress.



in protecting the health of the Navy and Marine Corp and in carrying out an extensive program of specialized training and research. Standard of professional care for patients were continually raised and the health of naval operating force reached a level never before attained. In calendar year 1958 in spite of the assignment of many of our men to areas with endemic disease problems or with virulent epidemics among the indigenous populations the noneffective rate for men absent from duty for medical reasons was at the unprecedented low of 12.5 per 1 000. This lowest rate in the history of the Navy represents a tremendous saving in manpower. Had the same noneffective rate prevailed in 1948 as at the beginning of the decade there would have been about 2 million additional sick days.

The changes in military medical needs and requirements in this past decade were greater perhaps than ever before. Many new conditions were encountered in the Korean conflict and entirely new problems were posed by a host of recent developments such as the advent of nuclear powered submarines and supersonic aircraft. To meet these changes and new requirements the research program in all its ramifications has of necessity become a major effort.

Naval medical research is carried out in 11 laboratories and at 10 clinical facilities. There are also 9 research contracts in force with universities or nonprofit research foundations. Most of the laboratories are staffed by a relatively small group of military personnel working with a larger number of civilian scientists. The research program is devoted to areas of prime interest to the naval medical service program guidance being obtained from the Naval Medical Research Committee of the National Research Council. Continual review by the Department of Defense Coordinating Committee on Sciences help to prevent unnecessary duplication of effort among the armed services and other government agencies and there is also close technical coordination with the National Institutes of Health, the Armed Forces Epidemiology Board and the National Academy of Sciences as well as direct liaison with the Army, Air Force and Public Health Service.

The largest laboratory is of course the Naval Medical Research Institute (NMRI) at the National Naval Medical Center Bethesda Maryland where a staff of 291 scientists and support personnel are engaged in studies that include the mechanisms of temperature regulation, the effects of vibration and the physiology and toxicology of the closed environment. In the field of heat stress a unique scientific tool is available at NMRI for studying human tolerance to the kind of stress routinely met in deserts or the tropics and soon to be encountered in spacecraft. This device a human gradient calorimeter (fig 1) has

## NAVY MEDICINE A DECADE OF PROGRESS

a wide range of versatility for advancing our knowledge of man's reaction to all types of thermal environments

Basic studies on thermal stress at NMRI led to applied field studies at Twenty Nine Palms California and Camp Lejeune Parris Island South Carolina that resulted in an 80 percent reduction in heat casualties during hot weather training operations. The importance to operating forces of such studies and of investigations on the physi-

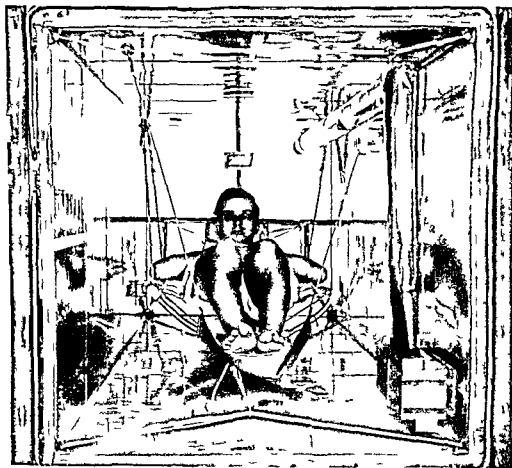


Fig. 1 Interior of human calorimeter with subject in position

ology of acclimatization is seen from the recent observation that troops suddenly flown from North Carolina to the Canal Zone showed a 70 percent decrease in combat efficiency for as long as 24 hours after their arrival in Panama. This past year further studies with the calorimeter led to the significant observation—of great importance to astronautical medicine—that the principal factor controlling heat regulation is the temperature of the blood in the midbrain rather than stimuli from the skin.

In January 1959 the U S Navy Toxicology Unit was established at NMRI to study toxicity and health engineering problems encountered aboard ships or in the design and use of new weapons systems. Rapid technologic developments have brought into use many untested but potentially toxic materials. Rocket fumes aboard ships and new hydraulic fluids used on airplane carriers and submarines are among the items requiring careful evaluation in order to protect personnel.

At the very beginning of the decade fundamental studies of the physiology of tissue transplantation led to the establishment of a tissue bank at the U S Naval Medical School also at Bethesda. Research on tissue preservation and transplantation made possible notable advances in a wide variety of surgical procedures including improved method of treating casualties who require reconstructive surgery. The tissue bank pioneered in developing the freeze-dry process of preserving human tissues so that they could be stored at room temperatures for later clinical use. This involved subjecting the frozen tissue to a 5 to 10 micron vacuum at  $-50^{\circ}\text{C}$  where ice crystals pass directly to the gaseous state and the tissue becomes so dry it cannot decompose. Tissues are also preserved in nutrient media for as long as 6 weeks. A third method of preservation by impregnating with glycerol and keeping the tissue in dry ice makes it possible to use the material after 6 to 12 months.

The tissue bank which is the largest in the world and has served as a model for many similar installations has rendered service of great value both to military medical facilities and to other governmental and civilian hospitals. The bank has performed hundreds of sterile postmortem excisions and stored many thousands of tissue deposits. The deposits shipped to all parts of the United States and many foreign countries have included bone, skin, fascia, dura mater, cornea, cartilage and arteries.

The use of stored tissue has been a collaborative study between the tissue bank and orthopedic surgeons, both military and civilian, and over 3,000 detailed case histories are on file at the bank. Now with the establishment in March 1958 of the Tissue Culture Division, an added laboratory tool is available for obtaining knowledge to be used in transplanting human tissue. Much has been learned by continuous observation of human bone cells growing within a flask (fig. 2). Another early achievement has been the development in collaboration with tissue culture experts of the National Cancer Institute of a pure strain of human skin cells that could be used in transplantation experiments. Fundamental cell research may define the immunologic factors currently limiting tissue transplantation.

## NAVY MEDICINE A DECADE OF PROGRESS

The dedication at the National Naval Medical Center in November 1957 of the nation's first all medical nuclear reactor with which there is associated a well instrumented radioisotope laboratory marked a major advance in medical capabilities. Production of radioisotopes of short half life ( $I^{128}$   $Cl^{38}$   $Na^{24}$   $K^4$   $In^{156}$ ) in close proximity to patients in whom they are used makes possible the em

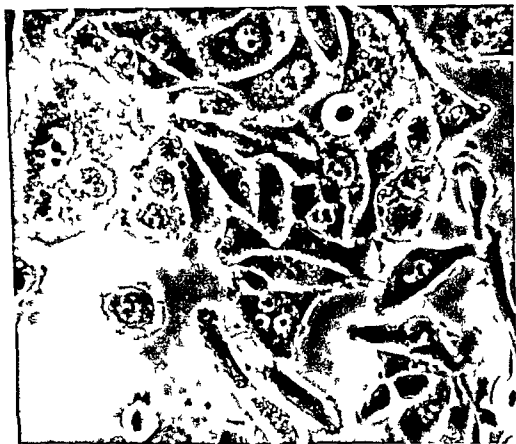


Figure 2 Detailed anatomy of human bone. It grown in tissue culture for 2 years. (Phase contrast photomicrograph x1600. d cell by one half)

ployment of isotopes that decay too rapidly to be brought in from distant points and their use will materially decrease any radiation hazard to the patient. An added advantage is the opportunity provided by the reactor for research studies on the effects of neutron irradiation of small biologic specimens and for the instruction of personnel in nuclear medicine. The availability of the reactor and associated facilities made possible the first course ever offered in nuclear nursing. Medical centers and hospitals in the surrounding area also have benefited by being provided with short half life isotopes.



Research at the U S Naval Dental School Bethesda has included such important contributions to the development of the dental air turbine and ultra sonic vibration instruments that the Smithsonian Institution has requested permission to display the pioneer models. More recently there was a successful demonstration at the school of an optical fiber probe and closed circuit television system that permits a dental operator and students or consultant to view simultaneously on a television screen selected areas inside a patient's mouth at magnifications of up to 35 times the actual size. Such a system may have *important added potentialities for viewing the inside of body cavities* as an aid to medical diagnosis and treatment or for illuminating such cavities without danger from electric sparks.

A major problem in the Department of Defense as in civilian medicine is the preservation and storage of blood for emergency use such as *the treatment of mass casualties*. At the U S Naval Hospital Chelsea Massachusetts a special laboratory has since 1954 been evaluating possible methods and in collaboration with the Protein Foundation Inc. Boston has been studying the use of red blood cells preserved in glycerol at low temperatures. Fresh blood is centrifuged to separate the red cells which are placed in glycerol and immediately frozen. At any time up to 8 months later rapid thawing and reconstitution in 5 percent albumin solution result in what appears to be a reasonably acceptable substitute for fresh whole blood. The oxygen carrying capacity is about the same as that of fresh blood and at present the medical and surgical service of the hospital in Chelsea are using reconstituted blood preserved in the manner described. Frozen blood in addition to its potentialities for limited stockpiling has the advantage of eliminating commonly encountered losses caused by outdating and will allow the storage of the patient's own blood for elective surgery whenever there is a special problem of rare blood type or unusual immunologic reaction.

At NMRI flash freezing has been studied as a possible alternative method of preserving blood. In this process whole blood is sprayed in nebulized form into liquid nitrogen and collects as a red sand on the bottom of the container. This can be preserved apparently indefinitely at  $-90^{\circ}\text{C}$  or below. Some difficulty was encountered in maintaining absolute sterility and in thawing the blood with sufficient rapidity and uniformity to prevent damage at the critical temperature range from  $-15^{\circ}\text{C}$  to  $-4^{\circ}\text{C}$  where crystals tend to form but studies of the characteristics of rapidly frozen whole blood have reached a point where a contract has been let with a commercial firm for the engineering development of the process.

## NAVY MEDICINE A DECADE OF PROGRESS

Three of our research laboratories are located in close contact with operating forces, where intimate association with a military operational environment provides an immediate awareness of the fast changing human demands of new weapons systems. Two of these laboratories the US Naval Medical Research Laboratory and the US Navy Underwater Sound Laboratory are at New London, Connecticut adjacent to both the US Naval Submarine Base and General Dynamics Electric Boat Division.

At the Medical Research Laboratory the areas of investigation relate primarily to human factors in submarine operations and include physiologic factors affecting submarine habitability auditory and visual abilities and selection of submarine personnel. Contaminants appearing in the air of nuclear submarines including carbon monoxide aerosols resulting from smoking and hydrocarbons from drying paint are of current interest.

At New London we have since 1946 been studying the problems of men inhabiting enclosed spaces in particular the long submerging submarine. The fact that our present nuclear submarines have been able to remain submerged for longer than was even dreamed of a few years ago attests to the success of these efforts. Part of the basic preparation for these achievements were studies of respiratory physiology involving the provision of sufficient oxygen for the crew and the removal of contaminants and waste products. Obviously space craft will present similar problems in respiratory physiology and at New London there probably exists the most advanced body of information on this subject along with the know how to undertake the work that can be found anywhere in the world. An awareness of this close relationship is seen in the fact that in September 1958 the first International Symposium on Submarine and Space Medicine was held at New London under the auspices of the US Naval Medical Research Laboratory. The meeting brought together military representatives and civilian scientists from 8 countries to integrate knowledge of the effects of atmospheric changes on physiologic systems such as the respiratory, circulatory and central nervous systems.

Our greatest concentration of research effort in aerospace medicine is at the US Naval School of Aviation Medicine Pensacola, Florida. The location of the laboratories adjacent to the Naval Air Training Command provides an excellent opportunity to assess the human factors essential to the control of military aircraft. Basic studies are in progress on the psychology of aviation as related to selection, training, motivation and morale and also on the long range effects on general health of a career in aviation. Studies of special operational interest concern survival, visual acuity, effects of high intensity noise, psychi-

atic evaluation of aviation personnel and human factors involved in aircraft accidents

We are proud of the fact that the first primate known to be living after having been flown into space and safely recovered is the Baker monkey (fig 3) which was packaged and flown to a height of 300 miles in Bio flight No 2 under the joint sponsorship of this laboratory and the U S Army. Physiologic data transmitted to the earth during the flight showed that no severe physiologic reaction occurred and that the period of zero gravity did not produce a marked change in any of the function measured. The laboratory is continuing to work on projects involving experimental animals which will be used to assure that man will survive the experience of space flight and a bio-package already has been developed that can be employed to test the performance of trained rats during 9 weeks of orbital flight.

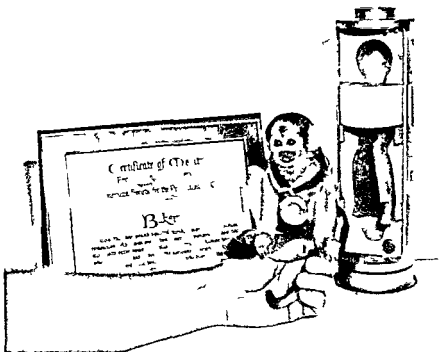


Fig 3 Baker monkey and pulown which flew to a height of 300 miles

Among several unique pieces of equipment available in Pensacola is the human disorientation device (figs 4 and 5) a research tool that will permit the study of combined accelerative and disorienting forces in multiple plane. This is being used in exploring the complex

problems of orientation and disorientation with which man will be confronted in space. Although designed primarily for studies of personnel reactions in conventional aircraft it has a vast potential for the future. In the same laboratory a room in which men can live for days or weeks at a time has been constructed on the hub of a centrifuge. This room can be rotated through a wide range of revolutions per minute thus permitting study of the probable effect of constant rotation on the occupants of space craft or earth satellites. It is thought that such rotation would be required to provide an artificial gravity environment but already we have discovered several bizarre effects on the occupant resulting from this constant rotation.

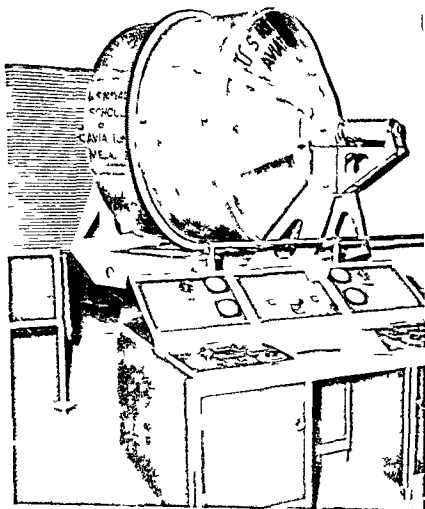


Fig. 1. Exterior of the human subject simulation device and control panel.

The Aviation Medical Acceleration Laboratory at Johnsville Pennsylvania is built around the world's largest human centrifuge which makes possible the study of take-off acceleration re-entry deceleration in flight acceleration stresses including tumbling control and performance problems and tolerable flight path patterns in both aircraft and space vehicles. The tying in of the centrifuge with the high performance Navy Typhoon Computer at the U S Naval Air Development Center has made it possible for a pilot in the gondola to fly a replica of the flight path that he would encounter in high performance aircraft or space vehicles. This dynamic flight simulator combination was used by prospective pilots of the X15 experi-

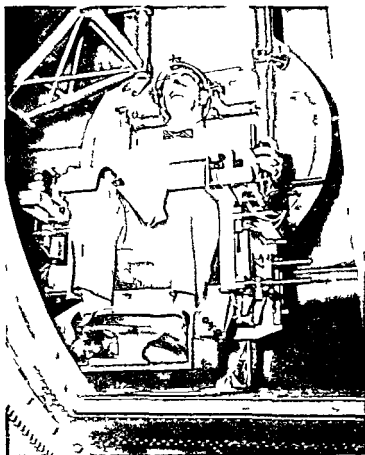


Figure 5. Interior of human disorientation device with Donald E. Stulliken trapped in it.

mental rocket aircraft as a training device and resulted in the detection of numerous potentially fatal defects in design or structure that now have been corrected. The seven Project Mercury astronauts also are receiving an essential part of their training on this centrifuge.

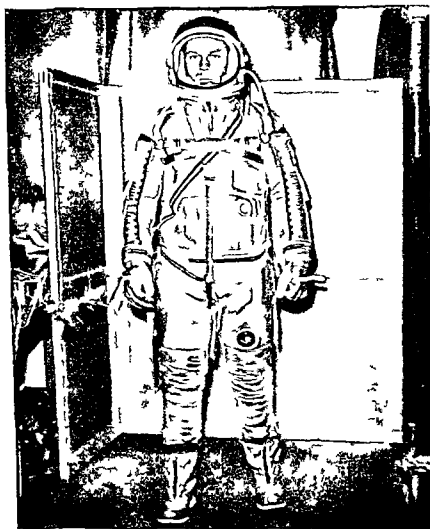


Figure 6 Modified Mark IV aluminumized full pressure omnienvironmental suit selected for use by Project Mercury astronauts

The Air Crew Equipment Laboratory at the U.S. Naval Air Materiel Center Philadelphia has developed successful immersion suits, anti-G suits, full pressure suits, helmets, restraint apparatus

and escape devices for better personnel protection. It is particularly gratifying that the Navy modified Mark IV aluminumized full pressure omnienvironmental suit (fig. 6) designed by this laboratory has been selected as the suit which the Mercury astronauts will wear. Further the large low pressure chamber in this laboratory is being modified to undertake full scale testing of the Project Mercury space capsule.

In the limited space of this brief report it has been possible to mention only a small fraction of the activities through which progress in naval medicine has been accomplished during the decade just ended. A few selected areas of research and development were chosen for limited discussion because they illustrated techniques of solving new problems and meeting new requirements of the atomic and space era and because all of them relate to the short 10 years during which the *United States Armed Forces Medical Journal* achieved its present status of distinguished maturity. For their notably successful efforts in bringing the *Journal* to this status the editors and all their colleagues and collaborators deserve a hearty Well done.

# IMMUNOLOGIC RESISTANCE IN ESKIMOS

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# Medicine in the Aerospace Age

MAJOR GENERAL OLIVER K. NIESS

SURGEON GENERAL UNITED STATES AIR FORCE

EVER SINCE THE AIRPLANE first became an instrument of combat the Air Force physician as part of the Air Force team has pioneered research in the vertical frontiers of aerospace. At the same time as part of the team he has provided continuous professional care to the military population at air bases which in time have come to circle the globe. This responsibility for the welfare of our flying personnel in environments peculiar to Air Force missions distinguishes Air Force medicine from that of the other services.

Development of the United States Air Force Medical Service since its organization on 1 July 1949 has followed as a corollary to the organizational and operational development of the United States Air Force established two years earlier. The *raison d'être* of this Service is to provide whatever type medical support may be required to carry out the Air Force mission. Its objective is to maintain the highest attainable degree of operational effectiveness on the part of the Air Force population.

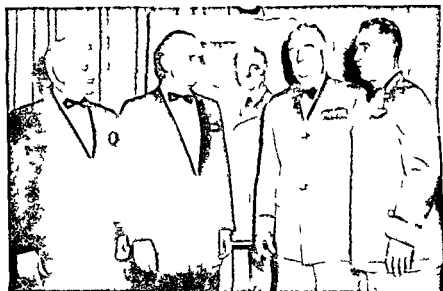


Having been tailored to support the requirements of a round the clock operational force the Air Force Medical Service has not followed the traditional medical pattern of military or civilian practice. Rather it is an organic part of the force structure. The Air Force Medical Service is a component part of each major air command.

In contrast to its sister services the Air Force Medical Service is established by military directive—not by public law—as are those of the Army and Navy. The Air Force Medical Service is more



over a supporting service rather than a separate command department or bureau. Nor is the surgeon general a Presidential appointee as are the surgeons general of the other Services. A personal appointee of the Chief of Staff he functions as a member of the Air Staff and is advisor to the Secretary of the Air Force and the Chief of Staff on all medical matters. As a staff officer he provides continuous technical direction of the total medical program in support of the Air Force mission.



Presented by the Surgeon General of the Air Force in the form of the report of the Major General D. C. Ogle, USAF MC on the occasion of the retirement of the Major General M. C. G. Ogle, USAF MC (Ret.) from the service on July 1, 1958. Major General H. G. Armstrong, USAF MC (Ret.) served as Surgeon General from December 1, 1954 to June 1, 1958. Major General Ogle served as Surgeon General from July 1, 1954 to November 1, 1958. Major General Ogle is a USAF MC present Surgeon General.

In contrast to civilian medical practice and procedures the Air Force supports a different type of patient. Geared to provide short range therapy for a basically young and healthy adult population the primary effort of the Air Force medical mission is oriented toward pioneering research and development to overcome the environmental hazards of man in flight. It investigates and applies clinical support to preserve a continuously healthy and effective military population. It maintains as a housekeeping function throughout the commands

a dynamic preventive medicine program. Thus the Air Force medical complex at air base dispersed throughout the globe is housed in composite medical facilities rather than traditional hospitals in order to encompass the many support functions.

Moreover the geographic location of Air Force composite medical facilities is in contrast to that of civilian hospitals which are normally situated in metropolitan areas. Since air bases, on the other hand are necessarily some distance away from large cities their medical facilities are likewise dispersed at a distance from densely populated regions. Whenever there is a major geographic relocation of command because of change in mission the pattern of medical support quickly changes too.

Aerospace medicine is rooted in World War I. Its development has followed a long and arduous course. Just as the single engine Jenny gave way to the bombers of World War II and the latter gave way to the century series the century series will give way to boost glide and more sophisticated space vehicle.

Early in World War I it became apparent that the physical defect of the pilots—rather than the structural deficiencies of the aircraft—were responsible for the majority of the fatalities which occurred in connection with the war in the air. As a result the Army Signal Corps established the Air Service Research Laboratory at Mineola Long Island in January 1918 for the purpose of pioneering research in aviation medicine and establishing improved flying standards for pilots.

In the decade following World War I there was little interest in aviation medicine. At Wright Air Field however test pilots were running into difficulty because plane design was out of step with human engineering.

At this point Colonel (later Major General) Malcolm C. Grow then base surgeon at Patterson Field adjoining Wright Field conceived the idea of developing a laboratory that would reconcile human engineering with plane design. As early as 1932 he had published the first paper in America on the subject of aviation medicine. He then conceived the idea of a research laboratory that would tie itself with human engineering as a component of plane design. Grow brought Captain (later Major General) Harry G. Armstrong to develop the laboratory and its program. Colonel Grow then became chief flight surgeon in Washington D.C. The Air Service Medical (now Aerospace) Laboratory opened in 1941. Grow and Armstrong were named as co-founders.

Meanwhile the Air Service Research Laboratory gave its name to the School of Aviation Medicine and had its own

Field Texas without any break in its operation Whereas the laboratory at Wright Patterson Air Force Base was concerned with hardware the school dealt primarily with physical standards for man in flight Thus involved a threefold mission teaching medical personnel aviation medicine carrying out research in the problems of aviation medicine and providing consultation services During World War II the program expanded and by the end of the hostilities the school had graduated more than 4 200 medical officers as well as several thousand nurses and aeromedical technicians



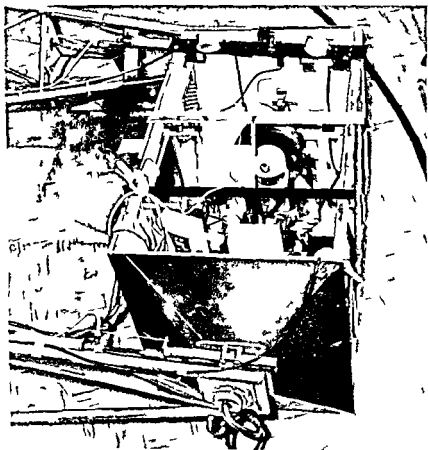
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Aero space medicine was first formalized into a systematic program on 9 February 1949 when Colonel Harry G Armstrong then commandant established the first department of space medicine in the world Headed by Dr Hubertus Strughold who had pioneered aeromedical research in Germany prior to joining the School of Aviation Medicine staff this program is now in its second decade It was here in February 1958 that Airman Farrell made the first

## MEDICINE IN THE AEROSPACE AGE

simulated space flight in the cabin designed by Doctor Strughold. Since that time the school has carried out much further study in the use of the space cabin simulator. In October 1958 twenty Strategic Air Command pilots became subjects for a one year experiment in space cabin simulation. Thus the School during the past year has been gathering significant data for an eventual detailed report on this great problem.

During 1959 under the dynamic leadership of Major General Otis O. Benson Jr. a new physical plant for the School of Aviation Medicine was completed at Brooks Air Force Base, Texas, to which the School moved from Randolph Air Force Base. Dedication ceremonies were held on 14 November 1959.

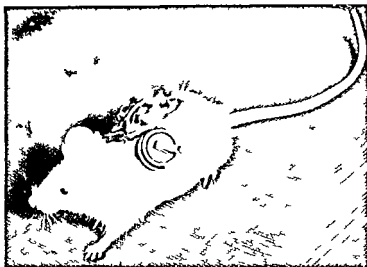


Man's ability to withstand acceleration force tested in the centrifuge at the Aerospace Medical Laboratory, Wright Air Development Center, Wright Patterson Air Force Base, Ohio.

To keep pace with the emerging requirements for aerospace flight it became increasingly apparent that the aerospace research and

teaching mission should be correlated with a balanced clinical program. As a result on 1 October 1959 the USAF Aerospace Medical Center—first of its kind and one of which the American people can be justly proud—was established. General Benon elevated to the position of commander of the Center continue to serve as commandant of the School of Aviation Medicine.

Meanwhile aerospace medical research has steadily advanced at other laboratories.



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In the field of aviation medicine the Aerospace Laboratory at Wright Patterson Air Force Base holds an unusual position among service laboratories because of its dual mission. This mission involves in addition to applied research the actual development of end items of personal equipment. During fiscal year 1959 the Aerospace Laboratory laid much emphasis upon research and experimentation related to space flight. This work has included contributions to the design of a closed ecologic support system for manned space flight and the continued development and testing of full pressure suits for the X-15 program.

The Air Force Missile Development Center of the Air Research and Development Command at Holloman Air Force Base, New Mexico

contributes to the Air Force human factors program in two broad fields—space biology and biodynamics.

The Arctic Aeromedical Laboratory in Alaska has as its mission the investigation of problems affecting living conditions and combat efficiency of military personnel in the Arctic. The laboratory has continued to make progress in many phases of scientific research.

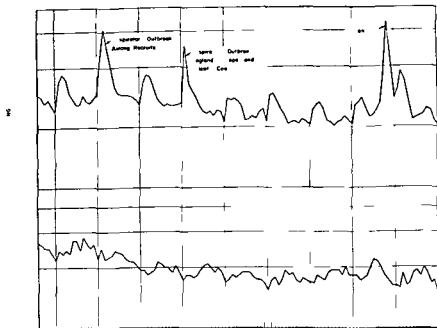
Meanwhile within the Office of the Surgeon General in Washington, D.C., the Nuclear Medicine Division was established within the Directorate of Professional Services in June 1959. This reorganization had become necessary in order to provide for a single, well directed and controlled Air Force nuclear medicine program capable of meeting the present and anticipated responsibilities of the Air Force Medical Service in the fields of nuclear medicine, special weapons, defense, radiobiology, radiation health physics, and the biosciences in general.

Aerospace medicine and nuclear medicine are however virtually inseparable under present conditions. The development and employment of manned and unmanned nuclear weapons systems and the requirements of space travel have presented the Air Force with many radiobiologic problems in aerospace medicine. Accordingly, the School of Aviation Medicine has devoted much attention to the study of the hazards of acute and chronic effects of radiation exposure and the possibility of finding compounds to protect against or modify these effects. Solutions to such nuclear problems were sought in a combination of SAM and contract studies in collaboration between Air Force and Atomic Energy Commission facilities and through participation at AEC's Nevada Test Site and Eniwetok Proving Ground.

The philosophy of the United States Air Force and its predecessor agencies—the Air Service, the Air Corps, the Air Force Combat Command, and the Army Air Forces of World War II—has never varied from one basic tenet. Insofar as possible, medical care is brought to the individual at base level. The base medical facility is the cornerstone of the USAF Medical Service.

Prior to the establishment of the USAF Medical Service in 1949, the individual base provided general medical care at base level but depended upon the Army for specialty care. With the establishment of the Service, it was assumed that this arrangement would continue and no arrangements were made for Air Force general hospitals. Less than a year later, however, the Korean conflict proved that this system was unfeasible. With the sudden expansion of force strength, Army and Navy facilities were suddenly hard pressed to meet their own requirements. The Air Force was compelled to enlarge its hospitalization capabilities.

When the Air Force Medical Service was established on 1 July 1943 the Air Force strength was 423 000. By May 1950 it had declined to 409 000. Following the outbreak of Korean hostilities the number of person on duty increased to a peak of 930 000 in May 1953. It dropped below 900 000 in November 1957. Throughout the period the age-composition the officer airman and the flying-status proportions have varied little. However mission and geographic deployment have varied greatly. These variations have had a bearing on the number and nature of illnesses reported.



Administrated by the Department of the Air Force personnel  
July 1949-December 1958

Meanwhile the number of Air Force dependents grew. The increase resulted both from the growth of the Air Force after the outbreak of the Korean conflict and from a rise in the ratio per sponsor. Five years ago there were 413 000 married persons and 4 0 000 dependent children in the Air Force. Today there are 483 000 married persons and 769 300 dependent children. The growth of the Air Force family unit has among other things resulted in an increased number of childhood diseases to be treated. Last year for example we treated nearly 50 000 children. We average today more than 400 000 inpatient

admissions and our outpatient visits have catapulted to nearly 12 000 000 per year

These figures indicate the increase in outpatient care required to support military families living at dispersed Air Force bases throughout the world

To support this requirement the Air Force has pioneered the Air Force Clinic which operates like civilian clinics such as Mayo The Air Force Clinic at Andrews Air Force Base hospital Washington D C is an example Here the Clinic is an integral part of the hospital with the staff of specialists each with a private office serving both inpatients and outpatients This has been one of the major developments in Air Force medicine during the past 10 years

Finally in the area of specialty care the Air Force Medical Service has developed a fully mature clinical capability in the relatively short span of a decade The 1 000 bed hospital at Lackland—now part of the USAF Aerospace Medical Center—is our first teaching hospital and our largest It is an excellent example of how the practice teaching and diagnostic investigation of clinical medicine combine to increase the combat effectiveness of the Air Force All told the Air Force has had 73 hospitals accredited by the Joint Commission on Accreditation of Hospitals Of these 15 are overseas

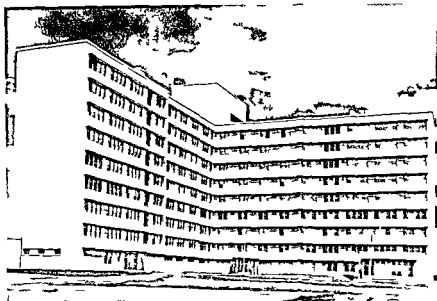
Since its origin 10 years ago the Air Force Medical Service has constructed more than 200 new medical and dental facilities Today there are 11 Air Force specialty hospitals in the continental United States and one in each major overseas command offering care in 31 medical specialties In providing maximum medical support of the Air Force and complete clinical care of the Air Force man and his family and in the interest of not duplicating facilities or service we have worked closely with the other services in sharing capabilities

The emergence of the composite medical facility has met the particular requirements of the medical service complex at isolated Air Force bases throughout the globe The complex for example must house the Air Force clinic with its waiting rooms examining rooms private offices for the doctor—not merely a certain number of hospital beds per square foot There must be laboratories to serve the specialties Thus the Air Force composite medical facility is tailored to meet the changing pattern of clinical support of the Air Force mission

During World War II the soundness of the concept of aeromedical evacuation of the sick and wounded was demonstrated and during the Korean conflict air evacuation was accepted as the preferable mode of transportation The Military Air Transport Service is now responsible for carrying out worldwide evacuation service for the De



partment of Defense. In the last decade MATS has moved approximately a half million patients in its global aeromedical evacuation system.



U S A F H o s p i t a l A F B a s e T

The readiness of the flight USAF Medical Service was tested during the Korean conflict in the course of which it developed into an organization designed to withstand the stresses of rapid mobilization. Subsequently it has been prepared in time of crisis at Formosa and the Taiwan Straits in the Pacific at Lebanon in the Middle East. Current mobilization plan and training are designed to fulfill the military mission in case of sudden enemy attack.

During the last decade we have worked closely with the Inspector General USAF in an effort to identify medical problem areas. Resolution of these problems as is being accomplished through close integration of effort by base surgeon, numbered Air Force surgeons, major command surgeon, and the Office of the Surgeon General.

A basic concept that the USAF Medical Service is striving daily to translate into action is the importance of interrelating of medical information and planning. For example, the School of Aviation Medicine plays a vital role through its training of allied medical students. Likewise the annual medical conferences attended by allied officers are important in translating this concept into reality, as are the

regional medical conferences symbolized by those of PACAF and USAF.

Regularly since 1955 intercountry medical conferences have been convened by the Air Force in the Pacific bringing together military physicians from the United States Armed Forces and from the Armed Forces of Title III countries in the Pacific Air Forces area. In addition many civilian physicians of prominence in these countries including Burma and India have attended medical conferences and participated in the exchange of information and the promotion of good will. The Air Force has gained stature and recognition from such gatherings of doctors from all countries in an atmosphere of learning and fellowship. It is through this kind of professional contact among medical people within the area of the command that progress toward the establishment of international friendship can best be made.

The Air Force has operated an extensive training program for civilian and military interns, physicians and technicians at several United States Air Force hospitals in Japan and the Philippines.

The cumulative effect of all this is twofold. There is increased stature of the participating medical services and there is a definite impact caused by the absorption of a portion of the medical burden by the participating allied medical services.

In December 1959 I attended with members of my staff the PACAF Medical Conference at Baguio in the Philippines. At this conference there were representatives from 10 allied Asian countries as well as representatives from the three Armed Services.

We have gained much in the mutual exchange of medical information with our friends of allied nations. Not only have we improved our professional knowledge but also I hope we have furthered understanding and mutual trust among our peoples.

The practice of medicine is universally based upon mutual trust and understanding between the doctor and his patient. This same relationship of mutual trust and understanding must also underlie world peace if it is to be enduring.

## THE SYMPTOM OF OVERWEIGHT

Overweight is a symptom like the temperature of 105° with pneumonia. It would not make sense just to give a pain to lower fever and not treat the pneumonia. The factors behind the overweight are more important than the weight itself. It may be better with this overweight patient to avoid talking about the obesity itself and discuss the factors in personality and life situation that produce the diet. —R. BERT H. BARNES, *Attitude of the Physician Toward Obesity*, *Clinical Medicine*, May 1959.

# The Society of Medical Consultants to the Armed Forces

MAJOR GENERAL SILAS B. HAY MC USA (RET)

FOR MORE THAN a dozen years a nationwide group of eminent civilian physicians and surgeons has been helping to solve the medical problems of the Armed Forces and seeking to forge an ever-closer link between civilian and military medicine in the interest of national defense. Little recognition has been given to their activities but these men have played an important role in developing and maintaining the high standards of medical care now being provided by medical services of the Army, Navy and Air Force.

The continued intense interest of these men in military medicine, their keen understanding of the many complex problems involved and their willingness to devote time from busy private careers to help resolve them has been both amazing and heartening to everyone in the Armed Forces medical services who has observed and benefited from their expert counsel and service. The group has no official status.

When it was formed in 1946 the group was known as The Society of Medical Consultants in World War II. Membership was restricted to civilian physicians who had served in uniform as medical consultants to the Medical Department of the United States Army during that war. The society was unique in that it was organized simply in the hope that such a group through the weight of its influence and experience gained in military medicine might be of benefit to the Army Medical Department in the years following the war. Immediately after its establishment the society volunteered its services to Major General Norman T. Kirk, then the surgeon general, to assist him in every way possible in reorganizing his department on a sound peace time basis. The obvious proud hope at the time of the founding was Dr. John Minor Washington, D.C., president of the society in 1953, stated at the annual meeting that year was that the great cataclysm

General Hay is the Surgeon General of the Army and Director of the blood program of the National Red Cross.

we had passed through was the end of wars, at least in the lifetime of the group." Certainly, the founders of the society could not possibly have envisioned in 1946 that the years ahead would constitute one of the most critical periods in the nation's history. Neither could they foresee the extensive use that would be made of the society's services during those years, not only by the successors of General Kirk, but also by the heads of other departments and agencies of the Government.

At any rate, as the years went by and the society continued to flourish, it became obvious that what at first had been a "generous gesture" had developed into a tradition. It also became obvious that if the society was to avoid becoming a 'last man's club' because of the restrictions it had placed on membership, some action would have to be taken to perpetuate its life. Following the establishment of the Department of Defense and the outbreak of the Korea conflict, requirements for active membership were liberalized, in 1951, to include civilian physicians who had served on active duty as commissioned medical officers in any of the three military departments and who had served in a consultant or comparable capacity either during or subsequent to military service. Accordingly, the name was changed to its present title of The Society of Medical Consultants to the Armed Forces.

All active members of the society are topflight professional men. Many are prominent medical educators; the society is represented on the faculties of more than three fourths of the 84 approved medical schools in the United States. Other members are practicing physicians and surgeons in their respective communities. Still others occupy important posts in outstanding civilian hospitals or medical institutions. Many of the members though by no means all of them are Reserve officers in one of the three services.

Contrary to the original belief that interest would wane with the passing years and the membership shrink, the group continues to grow. Each year new members are accepted. The original roster in 1946 contained 178 names. Today the active membership numbers 372. In addition there are 3 emeritus members (former active members who retired because of age or ill health), 27 associate members (officers in the medical services of the Regular military establishment of the United States), and 13 honorary members (distinguished officers and consultants of the armed forces of the United States allies who served in World War II or a subsequent conflict). Associate members are eligible for active membership upon their retirement from active duty with the military departments. Only the

active members pay annual dues. The society's membership is still predominately made up of civilian physicians who at one time or another were on active duty in the Army. Of the 100 currently active members, 78 served with the Army, 20 with the Navy, and 1 with the Air Force.



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During the 13 years since the group was formed 99 members have died including 3 of the founders. Among these was the society's first president Dr. Elliott C. Cutler, Mosley Professor of Surgery, Harvard Medical School, and a brigadier general, Army of the United States, who served as chief consultant in surgery in the European Theater of Operations (ETO) in World War II. After he learned that he had an incurable disease and knew that he had only a short time to live, Dr. Cutler wrote to Secretary of the Army Kenneth C. Royall in 1944 to inquire whether he could be of any assistance to the Army Medical Service in his remaining days. Such spirit was typical not only of Dr. Cutler but also of many of the other leaders of the society who had done so much to strengthen the bonds between civilian and military medicine.

Dr. Cutler was one of the 14 original members and founders of the society who met at the Army Navy Club in Washington on 16 February 1946, shortly before their return to civilian life, and unanimously agreed to form the organization. Of the 11 surviving charter mem-

## SOCIETY OF MEDICAL CONSULTANTS

bers, 10 are now associated with medical schools, and one is Chief Medical Director of the Veterans Administration. They are Drs Norman Q Brill, Edward D Churchill, Michael DeBakey, Francis R Dieuaide, Perrin H Long, William C Menninger, William S Middleton, Hugh J Morgan, Maurice C Pincoffs, Lauren H Smith, and Lloyd J Thompson.

Besides Dr Cutler, the other founders who have since died were Brigadier General Fred W Rankin, MC USAR, who served as chief consultant in surgery to the surgeon general, and Colonel Douglas A Thom, MC, USAR, who acted as consultant in neuropsychiatry, Headquarters, Second Service Command.

At the organizational meeting, the founders formulated a proposed constitution, decided to hold the first annual meeting in the fall of 1946, and elected temporary officers to serve until then. The consensus was that the annual meeting should be one day, with a dinner in the evening. It was also agreed that the membership of the society should be constituted of those present at the organizational meeting and "other individuals selected from civilian internists, surgeons, neuropsychiatrists, and specialties in the subdivisions of these major fields who served temporarily in the Army of the United States during World War II and who during this period or some part of it served as professional consultants in an important command." The temporary officers were Dr Cutler, president; Dr Pincoffs, vice president; and Dr DeBakey, secretary-treasurer. In addition, four councilors were elected: Drs Morgan, Menninger, Middleton, and Churchill. The councilors together with the officers comprised the society's council, which was to establish policies subject to the approval of a majority of the members of the society present at the annual meetings.

The first annual meeting took place on 18 October 1946. Despite a railroad strike and a hotel strike in Washington, D C, about 140 attended. Which President Cutler said was "a happy augury for the future success and accomplishments of the society." The meeting was held at the Walter Reed Army Medical Center, which has been the scene of all subsequent sessions except the 13th annual meeting conducted on 24 November 1958 at the National Naval Medical Center, Bethesda, Maryland.

The constitution formally adopted at the first annual meeting set forth the following purposes for which the society was formed:

To preserve and encourage the beneficial associations of consultants in the various fields of medical endeavor.

To assist in the development and maintenance of the highest standards of medical practice in the Army.

# U S ARMED FORCES MEDICAL JOURNAL

To disseminate the principles and knowledge of military medicine gained in World War II

To foster an awareness of the civilian obligation to participate in the continued development of the Medical Department of the Army

To constitute a general group which will promptly and effectively at any time furnish all of The Surgeon General with additional assistance on problems confronting the Army

Except for changes in the wording from 'Army' to 'Armed Forces' and from 'The Surgeon General' to 'The Surgeons General' the statement of the purposes of the society in the present constitution differs little from that in the original one

Having busied themselves with organizing the society the temporary officers announced at the first annual meeting that they wished to turn their duties over to others. Consequently a new slate of officers was elected. Dr. Walter Bauer, Jackson Professor of Medicine, Harvard Medical School, succeeded Dr. Cutler as president. Dr. Frank B. Berry, now Assistant Secretary of Defense (Health and Medical), was elected vice president while Dr. Brian Blades, professor of surgery, George Washington University School of Medicine, and Dr. Donald M. Pillsbury, now director of the department of dermatology, University of Pennsylvania School of Medicine, were elected secretary and treasurer respectively. The newly elected councilors were Drs. Middleton, Thomas R. Glen Spurling, professor of neurosurgery, University of Louisville School of Medicine, Louisville, Kentucky, and W. Barclay Parsons, professor of emergency surgery, Columbia University College of Physicians and Surgeons.

Under the provisions of the constitution the vice president automatically succeeds to the presidency. Thus Dr. Berry, who was one of the most active members of the society before assuming his present post, became its president at the 1948 annual meeting. Listed here in sequence are the former presidents:

Ellitt C. Cutler, M.D., Professor of Surgery, Harvard Medical School, Boston

Walter P. Jackson, Jr., M.D., Chief Medical Officer, U.S. Army, Fort Belvoir, St. Louis, Missouri  
Frank B. Berry, Assistant Secretary of Defense (Health and Medical), Washington, D.C.

Hejmyl Thomas Jackson, Jr., M.D., Chief Medical Officer, U.S. Army, Fort Belvoir, St. Louis, Missouri

Donald C. Elkins, M.D., Chief Medical Officer, U.S. Army, Fort Belvoir, St. Louis, Missouri

Gaillard C. D. P. f. M. H. e. J. f. M. I. C. H. f. I. h. d. l. h.

G. C. I. l. th. P. f. f. C. l. S. r. y. Wa. Stat. U. l. e. ity. Colleg. f. M. H. Det. t.

Rh. d. A. I. P. f. f. Med. i. T. m. p. l. U. l. ty. S. l. l. f. Med. in. I. h. l. l. l.

## SOCIETY OF MEDICAL CONSULTANTS

John Minor Washington D C

Worth B Daniel Profe or of Medicine Georgetown University School of Medicine Wa hington D C

Jo eph M Hayman Jr Dean Tuft Univer ity School of Medicine Boston

Donald M Pillsbury Director of the Department of Dermatology University of Pennsylvania School of Medicine Philadelphia

George O Eaton A sistant Profes or of Orthopedic Surgery Johns Hopkins Univer ity School of Medicine Baltimore



D F ank B Be ry Ass tant S e  
tary of D fense (Health and  
Med cal) the th r d p e d nt of  
th e oc ty



D I Ridgeway Trimble p ofe or  
of cl n al surgery Un e ty of  
M ryland the 1960 p e d nt of  
th e oc ty

The 1958-59 officers were Drs Bruce P Webster associate professor of medicine Cornell University Medical College president I Ridge way Trimble professor of clinical surgery University of Maryland School of Medicine and associate professor of surgery Johns Hop kins Univer ity School of Medicine vice president William A How ard assistant clinical professor of pediatrics George Washington University School of Medicine secretary and Theodore J Abernathy, assistant professor of medicine George Washington University School of Medicine treasurer Dr Trimble is now the fifteenth president of the ocety

In November of each year members come to Washington at their own expense for the annual meeting Despite the fact that most of them belong to various other professional ocieties which take addi tional time from their busy private careers a surprisingly large number attend the e annual meetings The average attendance is



Medical) At one time during 1961 the chairman and two of the other three who composed the Armed Forces Medical Policy Council were members of the society These were Drs W Randolph Love- lace II the chairman I S Ravidin John Riet Barton Professor of Surgery University of Pennsylvania School of Medicine and a retired major general and Alfred P Shand Jr now medical director of the Alfred I du Pont Institute of the Nemours Foundation Wilmington Delaware Another member of the society Dr Melvin A Casberg was the first to serve as Assistant to the Secretary of Defense (Health and Medical) as the position was originally designated Dr Casberg recently resigned as vice president for medical affairs at the University of Texas to accept the directorship of the Ludhiana Christian Medical College Ludhiana Punjab India

There is every indication that the Society of Medical Consultants will play the same vital role in military medicine in the years ahead that it has since World War II The radical changes in concepts and doctrine of war brought about by the development of nuclear weapons and the potentialities of space medicine make it imperative that the Armed Forces medical services continue to modernize and improve military medicine in order to be prepared for any eventuality The society composed as it is of an independent group of distinguished civilian professional men who are able and willing to help solve military medical problems can provide the expert advice and assistance needed to accomplish this difficult task

# SOLUTION OF THE STAPHYLOCOCCIC PROBLEM

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## The William L. Keller Lecture

# Lesions of the Parathyroid, Adrenal, and Thymus Glands Amenable to Surgery

FRANK CLENN, M.D.

PHYSIOLOGIC DISTURBANCES of the glands of internal secretion account for several bizarre clinical entities. Until a few decades ago these were viewed as curiosities for which little could be done therapeutically. As our knowledge about their normal function has increased and as their products have been identified chemically, correlations between disturbed function and clinical manifestations have been established. Thus early recognition of the pathologic states they engender is now readily accomplished. In recent years 3 of these glands—the parathyroids, the adrenals and the thymus—have been the object of special study at The New York Hospital-Cornell Medical Center. An increasing proportion of the disturbances are being corrected surgically with safety after suitable preparation. It is my purpose to discuss some of the facets of this endeavor from the surgeon's viewpoint.

### PARATHYROID GLANDS

In 1926 Collip and co-workers<sup>1</sup> reported their studies on the isolation of parathormone from the parathyroids. Five years later DuBois and his associates<sup>2</sup> established the diagnosis of hyperparathyroidism for the first time in this country at the Russell Sage Institute of the Cornell Medical Division of Bellevue Hospital. Charles Martel, the patient, exhibited most of the classic manifestations of hyperparathyroidism and also became an example of the difficulties that surgeons may encounter in locating a parathyroid tumor. He was operated

From the New York Hospital-Cornell Medical Center, New York, N. Y.  
Presented at Walter Reed Army Medical Center.

upon 3 times before the parathyroid adenoma was found within the mediastinum

Usually there are 4 parathyroid glands situated posterior to the thyroid lobes. The superior parathyroids are either near the middle and upper third posterior to the thyroid lobe or along the branches of the superior thyroid artery. However their blood supply is from the inferior thyroid artery. The inferior parathyroids rest near the inferior portion of the thyroid lobe posteriorly. Their blood supply is also from the inferior thyroid. The upper parathyroids are derived embryologically from the fourth branchial pouches. The lower 2 together with the thymus arise from the third branchial pouches. Their origin helps to explain the aberrant position in which both normal and tumorous parathyroid glands are found. The upper parathyroids are generally more constant in their position whereas the lower ones are not infrequently associated with the thymus in the anterior mediastinum.

The normal parathyroid gland has the shape of a pea, is small measuring about  $4 \times 3 \times 1$  mm and weighs less than half a gram. It varies greatly in color from mahogany brown to gray yellow and has an intermingling of fat. A thin but distinct capsule renders its dissection from adjacent tissue easy. In cross section its texture is homogeneous and resembles thyroid tissue but the color is often a distinctive pink.

The parathyroid gland secretes a hormone parathormone which is specifically concerned with the metabolism of calcium and phosphorus. In the healthy state the blood calcium level approximates 10 mg per 100 ml and the phosphorus 3 mg per 100 ml. An increase in parathormone is followed by an elevation of the serum calcium and a decrease in the serum phosphorus. There is much calcium in the body chiefly in the skeleton. There is also a good store of phosphorus in the bones and teeth and it is well distributed throughout the tissues in the form of organic compounds. There are several theories as to how parathormone acts. One is that the hormone decreases phosphorus reabsorption in the renal tubule thus resulting in a decrease in the blood phosphorus and an increase in the amount excreted in the urine. The calcium and phosphorus in the blood serum are in their ionized forms. As the phosphorus is lost calcium increases to compensate. To meet this need calcium is derived from bone. In abnormally high calcium serum level there is loss into the urine. Thus there is a loss of both phosphorus and calcium from the body. Another concept supported by experimental work in animals whose kidneys have been removed maintains that parathormone acts directly upon the bone liberating calcium. These

## WILLIAM L. KELLER LECTURE

two theories together afford a reasonable explanation in that they indicate the site of action of the parathormone to be both the kidney and the bone

*Clinical material* During the past 21 years 45 patients with primary hyperparathyroidism have been investigated and managed surgically at this hospital. Of the 45 patients 26 were women. The age range extended from 16 to 71 years with a peak age incidence in the sixth decade. The most commonly encountered symptoms were those related to the presence of renal calculi.<sup>3, 4</sup> Twenty-six patients presented primarily with urinary tract complaints. Five of these were demonstrated to have varying degrees of bone demineralization. Routine determination of calcium and phosphorus levels in patients with renal calculi accounts for the establishment of the diagnosis in a large portion of the patients we have treated and many patients known to us but treated by others. However emphasis is placed on the importance of repeated observations of these electrolyte levels, since there have been some instances particularly early in the course of the disease where occasional normal or near normal values were found.

Pain fracture or a mandibular cyst was the principal symptom in 15 patients 8 of whom also had kidney calcifications. There were 3 instances in which an enlarged thyroid was the presenting complaint and subsequent evaluation of vague muscular and gastrointestinal symptoms revealed the true diagnosis. The sole manifestation of hyperparathyroidism in 1 patient was recurrent severe pancreatitis. On 2 occasions the symptoms and radiologic evidences of chronic duodenal ulcer were concurrent findings. Muscular weakness was a prominent symptom in 12 patients and was more frequently noted when severe osteoporosis was present. Polydipsia was a significant finding in 3 patients. Stigmata of the disease were evident on physical examination in only a small number of the series and were usually skeletal deformities secondary to severe bone demineralization such as wedging and collapse of the vertebral bodies producing a diminution in stature and a varying degree of kyphosis. Other possible findings include muscular hypotonicity with severe hyperparathyroidism or rarely parathyroid adenomas large enough or so situated that they may be palpated on physical examination.

The most valuable laboratory findings include serum calcium and phosphorus levels, urinary calcium levels and changes in these with varying calcium intakes and the calcium tolerance test. Although elevated serum calcium levels were present in every patient some with borderline findings had to be followed periodically for several months before the abnormality was clearly demonstrated. The

Some of the symptoms of pheochromocytoma are also observed in conditions such as hypertension hypertensive heart disease hyperthyroidism islet cell tumors of the pancreas and circulatory instability as well as in pheochromocytoma. These include palpitation excess sweating tremulousness blanching and flushing pulsating headache and precordial and abdominal pain. If several of these are present the possibility of a pheochromocytoma must be considered. If only one of these symptoms is present and can be precipitated by some controllable stimulus then there is a reasonable probability that a pheochromocytoma is present. Although the appearance of symptoms may not be related to any particular incident it is not unusual for them to be initiated by emotional or physical exertion and more rarely by postural changes or by actual palpation or manipulation of the tumor. There is such a wide variation in the number and combination of symptoms as well as in the degree of intensity with which they appear that a complete and typical clinical picture is unlikely.

The classic attack consists of a precipitous elevation of blood pressure accompanied by pallor tachycardia precordial and epigastric pain and varying degrees of anxiety. Blood pressures may range to 300+/140+ mm Hg. It has been demonstrated that during an attack there is hyperglycemia and increased content of epinephrine and norepinephrine in the blood. Ocular fundus changes result from hypertension and are dependent upon its degree and duration. They range from venous dilatation and arterial spasm to papilledema with exudates and scarring.

Cardiac enlargement tends to parallel the duration and degree of hypertension. Although we observed it in only 3 patients it should be anticipated in all those with long standing symptoms. In addition neurofibromatosis was present in 3 of the 12 cases in our series and probably occurs in over one third of all patients with pheochromocytoma.

Roentgenographic evidence of tumor in the suprarenal area was present in 5 of the 10 patients treated surgically. Plain roentgenograms intravenous pyelograms presacral gas insufflation studies and more recently tomography afford additional aids in attempting to demonstrate the presence and location of these tumors.

As a result of large amounts of epinephrine produced by the pheochromocytoma other glands of internal secretion such as the thyroid and pancreas may be affected. The thyroid may be rendered hyperactive causing symptoms of thyrotoxicosis including exophthalmos. Diabetes or a diabetic tendency as indicated by glycosuria or by hyperglycemia as determined by the glucose tolerance test is present in

over half the patients. This is associated with a high epinephrine blood content. Blood sugar levels vary. The hyperglycemia present following severe attacks is associated with exhaustion and is an indication of the depletion of the liver glycogen.

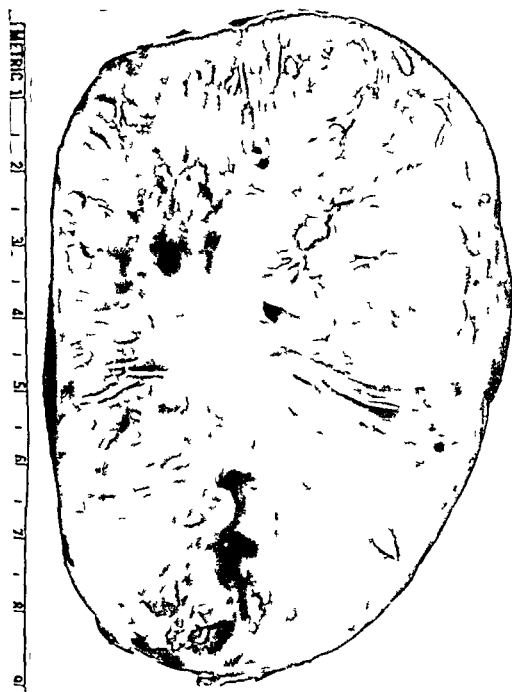


Fig. 1. Cross section of well-encapsulated adrenal pheochromocytoma weighing 195 g. The tumor is relatively homogeneous.

*Diagnostic test* Although numerous tests have been evolved including the use of blocking agents such as Regitine (phentolamine) methanesulfonate the most dependable information has been obtained by the measurement of increased catechol in the urine. Two hormones are known to be elaborated by the adrenal medulla and by the chromaffin tissue of the cell tumors—epinephrine predominating in the normal gland and norepinephrine predominating in tumors both actually and proportionately. These substances which are poured into the blood stream in large concentrations are capable of producing many changes in the vascular system. They are partially eliminated by the kidney through the urine. In our experience an elevation of the catecholamines as determined by the method developed by Goldenberg and associates<sup>17</sup> to a range of 200 to 700 units in the urine has been observed only in patients with a pheochromocytoma. We know of no false positive tests reported by others.

*Pathology* Chromaffin and argentaffin cell tumors are derived from the pigmented cells of paraganglionic tissue occurring in the adrenals, the carotid bodies, the nervous system and the intestinal tract. Pheochromocytomas, chromaffin cell tumors arising from the medullary portion of the adrenal or from misplaced adrenal tissue have been found in the thorax and abdomen along the ureter and at the ureterovesical junction<sup>18</sup> as well as in the normal retroperitoneal location of the adrenal. In size they vary greatly, ranging in our series from 6 to 60 grams. Usually they are well encapsulated of semicystic consistency and extremely vascular (fig. 2). They are single in about 90 percent and multiple in 10 percent of the cases. Less than 10 percent are malignant. On microscopic examination (fig. 3) the chromaffin cells are large with abundant finely granular cytoplasm which takes on a striking red-orange color when stained with chromium salts.

*Surgical treatment* The patient with a pheochromocytoma may be looked upon as one with a great reserve of pressor material that is overflowing into the circulation. Many stimuli will increase this overflow. Anticipation of the operation, the induction of anesthesia and manipulation of the tumor as it is approached surgically, for example, may cause large quantities of medullary hormones to be poured into the blood stream from the pheochromocytoma. The sudden deprivation of the cell by interrupting the blood supply of the tumor during operation usually results in hypotension and vascular collapse that may be followed by death if not corrected immediately. Anticipation of the possible events and preparation to meet them as they arise is mandatory for the successful removal of these tumors. Rest, quiet, an adequate nutritional intake and the use of Regitine

in 5 mg doses intramuscularly when indicated are the most important items in preparing the patient for operation

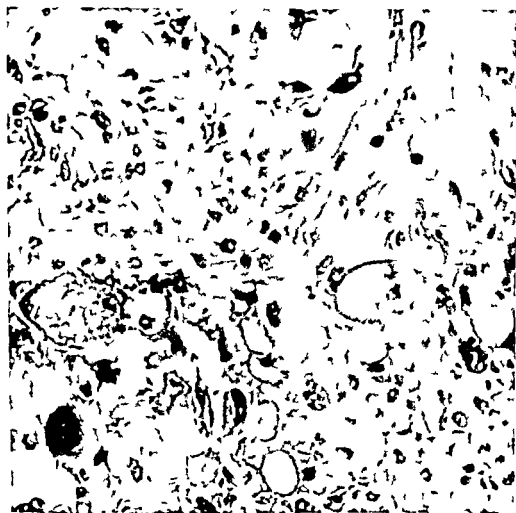


Fig. 3 Pheochromocytoma same specimen as in figure 2. On microscopical examination the chromaffin cells are large, irregular, polyhedral with a granular staining often a violet tinge (x110)

Certain details in the surgical removal of pheochromocytomas should be emphasized. During the induction of anesthesia with intravenous thiopental sodium (50-75 mg.) care must be taken to prevent a depressor response which may set off a hypertensive paroxysm. Ether administered cautiously by the closed endotracheal technique is used for maintenance anesthesia. In addition if the blood pressure rises greater than 20 to 30 mm Hg. during operative manipulation Regitine is given intravenously in 1 mg. doses. Its use is not routine but only on indication for example if during exposure of the tumor



marked increases in blood pressure and pulse rate occur. Following removal of the tumor a previously established norepinephrine drip is regulated to maintain the blood pressure within the normal range. Norepinephrine is given in measured doses of micrograms per ml. The drip is gradually decreased as the individual adjusts to the postoperative state. If the tumor removed is a large one and if the episodes of hypertension have been severe and frequent the amount of norepinephrine needed will probably be greater than if the clinical manifestations have been minimal. If much is required the concentration should be increased to avoid excess fluid administration.

In surgical extirpation of pheochromocytoma it should be anticipated that the curtailment of material being poured into the system from the tumor will in all probability result in vasomotor collapse unless adequate amounts of pressor substance are administered. The quantity to be used in a given patient cannot be calculated but rather the agent should be administered in amounts sufficient to obtain a therapeutic effect namely a reasonable blood pressure. Precision control of the blood pressure with norepinephrine after removal of a pheochromocytoma marks a distinct advance in the surgical management of these tumors. Further difficulties may be encountered as the patient's output of adrenalin gradually returns to a more normal quantity. A state of vasodilatation with fall in hematocrit and red count may ensue. In such patients addition of whole blood during the immediate postoperative course is indicated even though hemorrhage has not occurred.

Pressor substance may be used in amounts required to maintain a satisfactory blood pressure level and for as long a period as indicated without ill effect. In withdrawing such substances it should be remembered that vasodilatation usually follows. This may require blood to provide the needed total circulating blood volume. We have observed one patient who upon withdrawal of the pressor substance was given 1 500 ml of blood to fill the increased vascular bed. Twelve hours later as the vasodilatation that followed the vasoconstriction became less and the vascular bed approached the normal pulmonary edema developed but was readily relieved by a phlebotomy of 750 ml.

### Cortical Hyperplasia of Adenoma Cushing's Syndrome

In 1931 Harvey Cushing described a clinical syndrome characterized by wasting of muscles and fat-free centripetal obesity facial plethora hirsutism hypertension amenorrhea or impotence acne purplish skin striations osteoporosis diabetes and polycythemia. He attributed this complex to basophilic tumor of the pituitary. Over the intervening years it has been demonstrated that the syndrome

that now bears Cushing's name is consistently correlated with changes in the adrenal cortex<sup>20</sup> and only infrequently is there a coexistent basophilic adenoma. In addition there are leukocytosis, lymphopenia and decrease in the circulating eosinophils in these patients who are almost invariably in hypochloremic alkalosis and have elevated plasma and urinary 17 hydroxycorticoid levels. These manifestations of adrenocortical lesions can be corrected by surgical removal when this requires bilateral total adrenalectomy; substitution therapy is readily effectual in sustaining the patient.

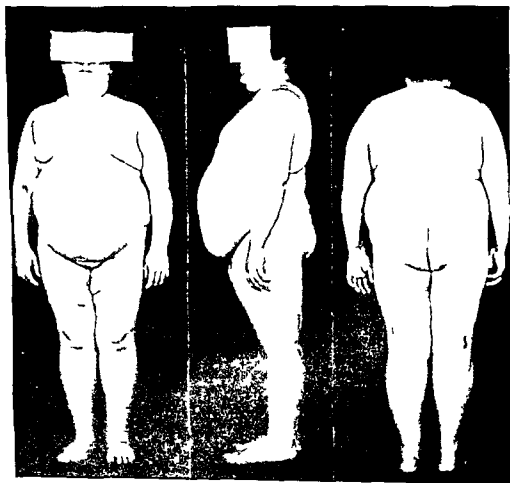


Fig. 4. Patient with advanced Cushing's disease exhibiting truncal obesity of central distribution, facial plethora, purple striae and hirsutism.

The general appearance of these patients is distinctive (fig. 4) and lends itself to ready recognition by those familiar with the disease.<sup>21</sup> Not infrequently because of muscle wasting and the peculiar distribution of fat in the supraclavicular and cervical dorsal areas, the patient

appears to have become obese but has no actual weight gain. Accompanying this is the moon facies with facial and body hirsutism. Scalp hair tends to pull out easily and the temporal hair level recedes. Many but not all patients have an atrophic skin, facial plethora, acne and increased bruisability together with purple striae.



Fig. 5. Continued development of the moon facies and the development of the moon facies.

Concurrent with the development of the bizarre physical and physiologic changes are psychiatric disturbances in well over 50 percent of instances. Many persons have been placed in institutions for the mentally ill because of failure to recognize the manifestations of this syndrome. There are many gradations of this disease; it may be so mild that there is little disability, and again in its most advanced stage there is complete incapacitation and death. Particularly in youth a mild form of the disease may appear and subside entirely without any form of therapy. For these reasons patients suspected of having Cushing's syndrome should have meticulous evaluation and a reasonable period of observation before being treated surgically.<sup>2</sup>

*Clinical material* Over a 25-year period 36 patients have been treated surgically for Cushing's syndrome at The New York Hospital Cornell Medical Center. All but 3 were female and they ranged in age from 9 to 52 years. Muscular weakness and fatigue were the presenting complaints in over 80 percent. Partial to complete amenorrhea was present in all women. Moon facies, hirsutism and facial plethora were present in about three fourths of the group. Hypertension of 150/90 mm Hg or greater was present in well over

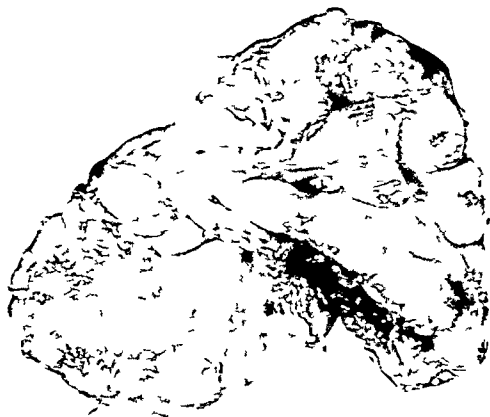


Figure 6. Nodules of hyperplastic tissue are evident on the entire surface of an enlarged adrenal gland removed from a patient with Cushing's syndrome.

half, whereas truncal obesity, acne, psychiatric disturbances, increased bruisability, and purple striae were slightly less frequent.

The suspected diagnosis is confirmed and the degree of the disease determined largely by the laboratory findings. The most dependable of these has been an elevation of the 17 hydroxycorticoids, which are rarely normal. A diabetic curve in the glucose tolerance test and eosinopenia are also commonly present. Less frequent but associated

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## DECREASE IN FATAL ACCIDENTS IN 1958

About 91,000 accidental deaths occurred in the United States during 1958, a decline of 4,000 from the toll in 1957 and the smallest number for any year since 1951. The accident death rate in 1958 estimated to be 33 per 100,000 population, established a new low record, decreasing from 36 per 100,000 in 1957. The more complete record for the year just ended reflects in part the reduction in motor vehicle fatalities. In 1958 for the second year in a row the number of deaths from motor vehicle accidents decreased by about 1,000 to a total of approximately 27,000. It appears likely from data available at this time that the death rate per 100 million vehicle miles reached a new low level. Nevertheless, motor vehicle accidents in 1958 again prior years accounted for more than two-fifths of all deaths from accidents.—FATAL ACCIDENTS DECREASED IN 1958. Motor Vehicle Insurance Company Statistical Bulletin December 1958

# The James Stevens Simmons Lecture

## Nutrition in National Defense and World Peace

JOHN B. YOUMANS M.D.

THERE IS perhaps no better field for the principles and practice of preventive medicine than nutrition yet the importance of nutrition was not easily established in the field of medicine. When I joined General Simmons in the Division of Nutrition during World War II, I was almost totally ignorant of the complex operation of military medicine. I was not and am not a public health or preventive medicine specialist. It was to General Simmons credit that he recognized the importance of nutrition in preventive and curative medicine and in military medicine fostering supporting, and developing this discipline in a way which made it an important phase of both military and civilian medical practice. Because of his keen foresight and understanding he may be considered partly responsible for some of the developments I am going to discuss.

Food or in terms of life nutrition is the second greatest material need of man. The various aspects of nutrition affect nearly every aspect of society. It is and has been a tool of government of politics of war and of conquest. It has affected exploration discovery and colonization and the fate of populations of countries and of civilizations. In modern life nutrition involves agriculture transportation industry and trade and through these the socioeconomic scientific and cultural aspects of our society. With the conquest of infections undernutrition or malnutrition becomes perhaps the largest health problem of the world today.

This statement calls for a definition of undernutrition. It has been stated that one half or one third (figures vary) of the people of the world are undernourished or hungry or starving but such statements are usually not based on a precise definition of undernutrition.

From U.S. Army Medical Research and Development Command Washington D.C. Presented 15 January 1959 at Walter Reed Army Medical Center Washington D.C.

and except for the number of individual involved no quantitative criteria are given. From some statements it might be assumed that starvation is of such a degree that useful work or even maintenance of life is impossible. Although this does occur to some degree in some localities at some times it is obviously not true continually of large segments of population. Useful work is done. The question is how much more might be done if better nutrition were provided. It is my purpose to demonstrate one way in which the enormous socioeconomic and sociopolitical importance of nutrition can be utilized in securing harmony, good will and peace among the peoples and countries of the world. Food and nutrition have been a tool of war. They can also be a tool for peace.

To illustrate I would like to describe some of the activities of the Interdepartmental Committee on Nutrition for National Defense (ICNND) an interdepartmental agency formed to deal with nutrition problems of technical, military and economic importance in foreign countries in which the United States has a special interest. Our government has recognized the importance of food and nutrition as an integral and important part of the Mutual Defense Assistance Program of Technical Military and Economic Aid and impetus for the organization of the committee was provided by a nutritional survey of the Korean army and by our efforts to assist the Chinese Nationalists in Formosa in 1953-54. These activities indicated the need for program coordination. An ad hoc committee on nutrition was organized at the National Institute of Health in July 1954 under Department of Defense sponsorship with representatives of the departments and agencies having an interest in and operating responsibilities for the Mutual Defense Assistance Program. In 1955 the committee was formally established when a memorandum of agreement was signed by the Secretaries and heads of the departments of Defense, Army, Navy and Air Force, State, Health, Education and Welfare, Agriculture and the International Cooperation Administration (ICA) to which was later added the Atomic Energy Commission. The first executive director was the late Harold R. Sanstead who served until his death in 1955 and who was a potent force in establishing the committee and directing its early activities. The committee has a secretariat consisting of an executive director, Dr. Arnold Schaefer, a nutritionist, a clinician and an agricultural economist. A panel of about 20 consultants in the fields of nutrition, medicine, biochemistry, food technology and agriculture serve as technical advisors.

The purpose and function of the committee is to deal with nutritional problems of technical, military and economic importance to these foreign countries. It conducts nutrition surveys primarily of

the armed forces but also of civilians in foreign countries eligible under the mutual aid program and reviews nutrition projects being conducted in areas where the United States is giving assistance. The committee also acts as a central clearing house for information on food and nutrition, evaluates problems of food procurement and feeding and prepares reports and recommendations for the agencies it serves.

## NUTRITION SURVEYS IN FOREIGN COUNTRIES

I would like to discuss particularly the surveys of nutrition which the committee has conducted and plans to conduct in foreign countries. Such surveys have been made in Iran, Pakistan, the Philippines, Korea, Libya, Turkey, Spain and Ethiopia. In addition a survey has been made of our National Guard and of the natives in Alaska. Surveys have also been planned for Peru and Ecuador. Other countries are eligible for these surveys and negotiations with some are in progress.

Surveys are made at the request of the governments concerned and for reasons I shall discuss later are primarily designed for their armed forces. However, civilians can be and have been included. The objective of a survey is to evaluate the nutrition of the population and potentials and capabilities for improvement if such is indicated to train personnel of the host country in all phases of nutrition, particularly in techniques of clinical, biochemical and dietary assessment and in food production and processing; to provide essential laboratory equipment and supplies for establishing permanent nutrition laboratories and institutes; to identify specific nutritional problems and make recommendations for their solution by the host country; and to advance the science of nutrition and nutritional health practices.

When a survey is requested and approved, a team is organized by the committee, usually composed of 1 or 2 clinicians, 2 or 3 biochemists, 2 food and dietary survey experts, usually former U.S. Army nutrition officers, a food technologist and an agricultural economist. Recently there has been a tendency to enlarge the team by the addition of a clinician to study general disease and medical care and a sanitary engineer. It is planned to include a pathologist, a dermatologist and an ophthalmologist on some of the surveys, both to improve the survey and to increase our knowledge of nutrition and of nutrition survey techniques.

The survey provides an opportunity for educating and training personnel of the host country. The country is asked to furnish counterpart personnel in the various specialties who are given an opportunity for



education and training in various aspects of nutrition and survey technics. The host country also furnishes laboratory space and certain logistic support.

One survey objective is the establishment or strengthening of a permanent program of nutrition to include laboratory facilities, a clinical program, food technology, an agricultural program, and possibly the establishment of an institute of nutrition. The administrative location of such an organization in the government depends on local conditions, but it is intended that such an organization serve both civilian and military needs whenever possible.

Procedures selected by the committee are used by survey teams to insure uniformity and reliable comparison. Sampling, an important aspect of the survey, is planned with the help of a statistician experienced in such surveys. The actual procedure consists of a physical examination, laboratory tests of blood and urine, a determination of food intake, a study of food preparation, and chemical analysis of food samples. Over all food production, processing, storage, and transportation, and potentials are surveyed by the food technologist and agricultural economist. Additional laboratory tests and examinations may be added for special reasons. For example, in one country electrocardiograms were taken. In another, a study was made of blood cholesterol. A study of parasite infestation is commonly done.

Results of the surveys can be considered from two aspects: the actual state of nutrition as determined by the assessment itself, and related results, some of which are intangible. One interesting aspect of these surveys is the general similarity of the findings. Although individual differences are found in the various countries, many similarities exist in both military and civilian populations.

In most countries, the military population has been found to be in reasonably good nutritional health, particularly in relation to calories and protein, as reflected in body weight (fig. 1) and musculature. Mild to minimal vitamin deficiencies were observed, again tending to be of much the same kind in all countries, the most common being vitamin A, vitamin C, and riboflavin deficiencies. Advanced nutritional deficiency diseases such as beriberi, scurvy, and pellagra have been rare. Because most disease was mild, close correlation between clinical, laboratory, and dietary findings was often lacking. This should not be considered as reflecting seriously on the correctness or value of the assessment, although it does emphasize the need for research on physical and biochemical evidence of nutritional deficiency, and for development of new diagnostic signs and tests. It should not be forgotten that in mass surveys the same close correlations cannot be expected as when dealing with individual subjects, and the results

with populations within the limits of error of the method are dependable and significant

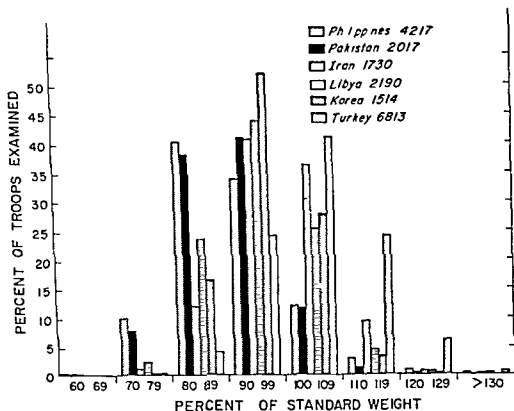


Figure 1 Body weight of troops examined in 6 countries

Although fewer surveys of the civilian populations have been made and fewer subjects studied the state of nutrition of these populations is uniformly poorer than among the military. In countries in which studies of civilians were incomplete or not made at all but whose armed forces are constituted on a draft and limited service basis useful and valuable information on nutrition of male civilians of army age has been provided by examination of recruits. Frequently these recruits reflected a somewhat poorer nutritional state than that of the personnel longer in service and at least in Korea exhibited a considerable degree of nutritional deficiency.

Individual differences in nutritional state of military personnel were found to depend on such factors as length of service, nature of service, geographic location of units, ethnic groupings, season of the year and similar influences. Foreign armies often lack regular uniform and complete systems of rationing and feeding and highly developed food service practices and outside sources of food such as post exchanges.

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## JAMES STEVENS SIMMONS LECTURE

As a concrete example I present the recommendations for 2 countries one relatively undeveloped with a very small military force, the other well developed with a relatively large armed force

### Libya

The following recommendations were made for this country

1 The Development Council should appoint a national advisory committee on nutrition composed of authorities in health nutrition economics and agriculture together with administrators and consumers representative and provide it with facilities for the efficient conduct of its work. This committee should have the definite responsibility and the means to encourage and organize nutrition research arrange for the training of Libyans as specialists in nutrition assess levels of nutrition and review and coordinate nutritional activities of other agencies. It should be able to guide at the highest level those responsible for framing national policies on subjects related to nutrition and where deemed advisable special sections of this committee could operate at a provincial level. Through its scientific member and eventually through trained personnel the committee should conduct nutrition surveys determine nutritional standards and provide advice on such shortcomings as may exist.

For this purpose the following suggestions are made:

a Nutrition surveys should be conducted from time to time by a qualified team composed of a physician a nutritionist and a biochemist supported by other specialists as may be required such as sanitary engineers and food technologists. The biochemical laboratory essential for assessment of nutritional status could also investigate and advise on the nutritive value of local and imported food.

b The committee should provide technical advice for national nutrition education program with agencies to carry the program to rural communities and cities through agricultural facilities and institutions health centers clinics and schools. The cure and prevention of rickets could be attained by public education on the need for proper food and adequate exposure to the sun in infancy. Educational efforts to increase production and use of carrots tomatoes orange and other fresh fruits and vegetables would greatly improve the nutrition of the whole population.

The armed forces should establish an advisory committee on military nutrition and food service to deal with problems pertaining to the feeding of troops and to assure maintenance of a high level of nutrition and physical efficiency of troops. If desired this committee might function as part of or in conjunction with the national advisory committee on nutrition. It is suggested that the committee include representative of the general staff officers who supervise food purchasing and food service (future quartermaster corps officers) and medical personnel.

Functions of this committee might be to

a Organize a school for food service personnel providing apprentice training in selected military kitchens.

b Superintend planning for different rations issued to the armed forces and testing of field and emergency packaged rations when developed.

c Assess periodically the nutrition status of the armed forces with the

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## JAMES STEVENS SIMMONS LECTURE

by educational and therapeutic efforts directed at mother and child. The value of such a program would be enhanced by continuing studies of the nutritional status of women and children attending the centers.

18 Investigation as to feasibility of increasing the local production of legume poultry eggs fish and sugar should also be continued. Since these products would add much to the nutritional value of the present diet. The effort to develop a date- and palm-sap sugar industry is commendable from an economic standpoint and production of domestic syrup and crude sugar particularly if sold at a reasonably lower price would reduce the need to import refined sugar.

19 The laudable effort now being put into developing fruit production in Italya would be further encouraged, and additional work on fruit vegetables and grain storage and transport would be justified.

20 The possibility of the economic production of tea in the Cebel should be investigated, since 10 percent of the country's foreign exchange expenditure is for tea.

21 The formulation of import-export policies pertaining to food should consider nutritional values. For instance when importing cereal it necessary for making bread of macaroni these might be imported as grain rather than flour if this practice would not unduly increase the net cost. This would provide work for already established flour mills and by products for the animal industry and would also afford an opportunity for the domestic production of an undrilled flour conforming to local food habits.

### Spain

The recommendations for Spain were as follows:

1 The armed forces should establish a nutrition section under the medical department, well represented by close association with the many competent men in nutrition as a civilian physician and scientist. This group should prescribe the military diet and assure its continuing adequacy. Meetings should be arranged for maintenance of proper health and nutritional practices in the handling and preparation of food and survey made of elected military populations to be certain that nutritional deficiencies do not exist. This group should report its findings to central authorities at regular intervals making recommendations to the same authorities on nutritional standards.

2 A food service section should be established under the quartermaster department charged with implementing recommendations of the medical department group. It should devote most of its efforts to improving food acceptability, mess procedures and mess sanitation and find effective ways to distribute its ideas to units in the field perhaps through a segment of specially trained officers to individual regiments. This section should also prepare and distribute cookbooks and guide for menu planning and a list of mess personnel in planning, buying and preparing nutritionally adequate and acceptable meals. A central school to which unit enlisted mess personnel would be sent for brief courses of instruction in the basic principles of food procurement and storage and of mess sanitation, nutrition and cookery should also be organized.

3 All members of the Armed Forces should be given some basic education in personal hygiene and nutrition. Because the bulk of the military services consists of trainees and almost all young men in Spain must undergo military service the trainees returning to civilian life would bring back higher standards of sanitation and nutrition to their home villages.

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The following recommendations based on the report of the agriculture and food scientist are not directly applicable to the military

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## EFFECTS OF THE SURVEYS

Too short a time has lapsed to demonstrate the influence of these surveys on the nutritional health of the armed forces of the surveyed countries with the exception of the Republic of Korea In 1953 a survey was made of the Republic of Korea's armed forces and recommendations similar to those described were made and implemented In 1956 a resurvey was made by the ICNND The nutritional state revealed by the 2 surveys and the improvement following the introduction of improved practices are shown in table 1 and figures 2 3 and 4

Aside from the knowledge of the nutritional state gained by the assessments there have been a considerable number of interesting and important related results The recommendations made as a result of the survey are presented only with the official report after being approved by the committee and its agencies and presented to the United States assistance group in the country concerned However results are discussed in a preliminary fashion with the proper agencies of the host country at the conclusion of the survey and some indication of the significance of the findings is given

I am happy to say that in many instances progress has been made in implementing these recommendations A nutrition service or institute has been established either military or civilian in 3 countries Plan

Table 1 Nutritional level of Ho can troops before and after 16 weeks of service U S Army survey 1953 and ICNND survey 1956 (Figure are percentages of total number examined)

Nutritional factor	1953		1956	
	Pre 16 weeks	After 16 weeks	Pre 16 weeks	After 16 weeks
Caloristatus				
Below 90 percent standard weight	27.0	48.0	29.0	76.0
90-110 percent standard weight	73.0	52.0	71.0	24.0
Protein				
Leged m	0.2	6.0		
Serum protein < 6 grams		11.0		
Thiamine				
Clinical deficiency	4.0	4.0		
Vitamin C				
Serum butyrol	21.0	43.0		0.6
Serum vitamin C < 0.2 mg/100 ml	60.0	100.0	3.0	
Vitamin A				
Fluoride ratio	3.0	13.0	5.0	4.0
Serum vitamin A < 20 g/100 ml		17.0		

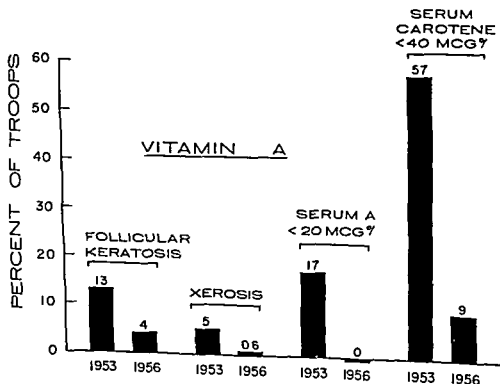


Figure 2 Improvement in nutritional level between 1953 and 1956 of Ho can troops with 16 weeks service Vitamin A deficiency



ning and progress in this direction is occurring in 3 others. In 1 country arrangements have been made for a civilian institute to serve the military. Some or all of the desirable activities of such a nutrition service will be instituted by these agencies. In 2 instances ICA is arranging to supply professional personnel to head these activities. In 2 countries in which a nutritional service has been established further surveys have already been made, some are in process, nutritional studies and research have commenced, and educational programs begun. In 1 country a large canning factory has been rehabilitated and reopened, and production of items useful for field rations begun, and a similar project is planned in another country.

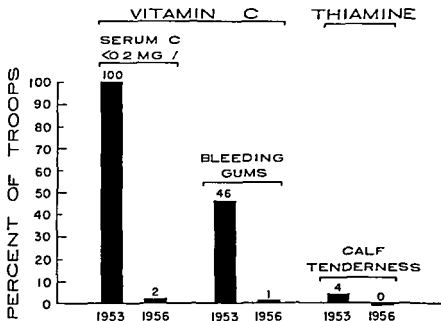


Fig. 3. Improvement in nutritional status between 1953 and 1956 for can-  
toop with 16 week survey. Vitamin C and thiamine deficiency.

One of the most important results of these surveys has been training of local personnel at all levels. In addition to assisting technical and professional personnel, physicians, biochemists, food technologists, agricultural experts, and auxiliary health personnel, this training has stimulated an interest in nutrition in the medical profession and other groups, as well as in governmental agencies such as agriculture and the ministries of health and social welfare.

An example of the interest in nutrition aroused is the establishment of the International Nutrition Committee which developed as a result of surveys in Iran and Pakistan. This organization which includes the United States, the United Kingdom and Turkey, as well as Iran and Pakistan, organizes and conducts annual conferences on nutrition to which representatives of other countries are invited.

### RIBOFLAVIN

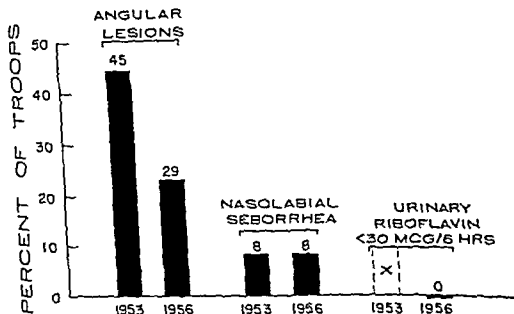


Figure 4 Improvement in nutritional level between 1953 and 1956 of Korean troops with 16 weeks service. Riboflavin deficiency

In addition to surveys ICNND provides continuing advice on technique and procedure assistance in securing personnel information regarding the sources of supplies such as reagents and instruments and follow up visits by consultants. Assistance is given in arranging for further education and training of citizens in this country and elsewhere in the selection of centers for study and in making arrangements for admission and for sources of support. Because of its organization the committee is more flexible than other agencies and better able to provide such services.

The surveys have been successful in every country not only because of the information gained by the assessment but also because of related benefits—development of friendship, institution of nutritional programs, education of persons at all levels including the

ning and progres in this direction i country arrangements have been made f the military Some or all of the d or trition service will be instituted by th ICA is arranging to supply professional i ities In 2 countries in which a nutriti lished further surveys have already b i nutritional studies and research have i programs begun In 1 country a larg habilitated and reopened and producti i rations begun and a similar project is plan

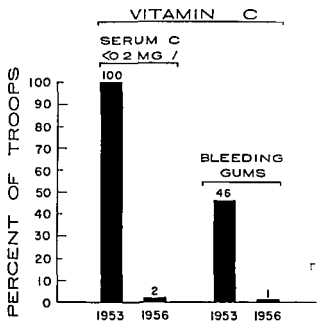


Fig 3 Imp m n t n n u t t o n i l l b e t w 1 t o o p w t h 16 w e e k r v V t m n C n d t f

One of the most important results of these surveys of local personnel at all levels. In addition to a professional personnel physicians biochemists f agricultural experts and auxiliary health personnel stimulated an interest in nutrition in the medical groups as well as in governmental agencies such the ministry of health and social welfare



# US ARMED FORCES MEDICAL JOURNAL

includes distribution to all medical service officers on active duty to many reserve officers in private practice to medical and dental school libraries and to editors of other medical periodicals on an exchange basis During the Korean War *Journal* circulation figures reached a high of nearly 40 000 copies a month

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Y ar	Army	N y	Air F	Oth	T t l
1950	97	91	17	23	228
1951	13	97	27	16	253
1952	19	78	51	13	26
1953	117	54	5	20	28
1954	83	64	39	20	206
1955	79	54	29	19	181
1956	79	60	35	10	184
1957	74	60	44	12	190
1958	73	9	2	14	163
1959	34	32	39	17	122
T al	868	63	365	164	2036

Since January 1950 the *Journal* has published more than 2 000 medical articles contributed by officers of the military medical services and other authors without military affiliation The published reports have been informative diverse and often controversial—covering professional and administrative aspects of the medical sciences including all the clinical specialties as well as an occasional historical note It is the mission as well as the good fortune of the *Journal* to have reported many advances and new developments in military medicine in the Armed Forces The senior authors of 868 papers were regular and reserve officers of Department of the Army medical services Papers from Navy medical service authors totaled 639 with 365 contributed by Air Force medical service personnel In its 10 year history more than 2 400 reviews of new books and monographs have appeared in the *Journal* pages This broad coverage of medical texts has given *Journal* readers an average of about 20 reviews in each issue

In observance of the *Journal*'s tenth anniversary the editors are appreciative of the many congratulatory messages and good wishes that have been received Excerpts from these letters appear on the following pages and additional ones will be published in subsequent issues

# THE JOURNAL EDITORS



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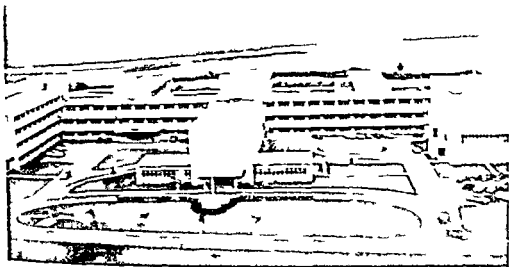


## TENTH ANNIVERSARY GREETING

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ON THE TENTH ANNIVERSARY OF THE UNITED STATES ARMED FORCE MEDICAL JOURNAL, THE PROFESSIONAL PUBLICATION OF THE MEDICAL PERSONNEL OF THE DEPARTMENT OF DEFENSE, I SEND YOU GREETING FROM THE MEDICAL LIBRARY ASSOCIATION. IT IS GRATIFYING TO ME TO HAVE THE OPPORTUNITY TO OFFER YOU OUR CONGRATULATIONS. WE ALUTE THE JOURNAL FOR ITS PAST ACHIEVEMENTS. WE ANTICIPATE WITH CONFIDENCE ITS FUTURE ONE.

MISS MILDRED JORDAN, PRESIDENT



U.S. Naval Hospital, Guam, Mariana Islands

### A Decade of Vigorous Life

University of California  
School of Public Health  
Berkeley, California

As we enter the second decade of the vigorous life of the U.S. Armed Forces Medical Journal, may I join with you and others in paying tribute to its past successes and looking forward with keen anticipation to its future. For many years it has been my privilege to serve on commission and more recently on the Central Board of the Armed Forces Epidemiological Board. The Journal and Board are inspiring examples of the strength of the individuality of the three Armed Services united in the common defense of our country. The new look of the Journal is a symbol of its humility and ability to move ahead in our ever-changing world. We all salute the Journal and look forward eagerly to the original articles and experiences which contribute so greatly to the quality of medicine in all three services.

CHARLES I. SMITH, M.D., DEAN



## Important Milestone

Industrial Medical Association  
Chicago Illinois

Congratulations to our distinguished board that through the efforts of publication of the United States Armed Forces Medical Journal we believe the mark important milestone in the history of military medicine. Many of you have participated in military service of which you are proud to feel the need of this journal. With our united reports in the Armed Forces keep up your good work and all best wishes from the Industrial Medical Association.

D. JOHN LAURE MD President

Cancer Research Institute  
New England Deaconess Hospital  
Boston Massachusetts

I am happy to note that the U S Armed Forces Medical Journal marking its tenth anniversary. In the fourth year of its existence medical fraternities of the armed forces of the United States and the military medical profession have kept going breath of the new accomplishment of military medicine. Heart congratulations to the author of this significant milestone. In the early years of its existence it has been a source of courage and strength to the Armed Services and has been a source of strength to the medical profession. It has been a source of strength to the medical profession of the United States and the world. It has been a source of strength to the medical profession of the United States and the world.

SHIRLEY WARR MD

## Rapid Growth Reaching Standards

May Clinic  
Rochester Minnesota

To all who have had to do with the birth and rapid growth of the U S Armed Forces Medical Journal I send congratulations. I am proud to have had a part in its history. It is a source of strength to the medical profession of the United States and the world. It is a source of strength to the medical profession of the United States and the world. It is a source of strength to the medical profession of the United States and the world.

C. W. M. MD

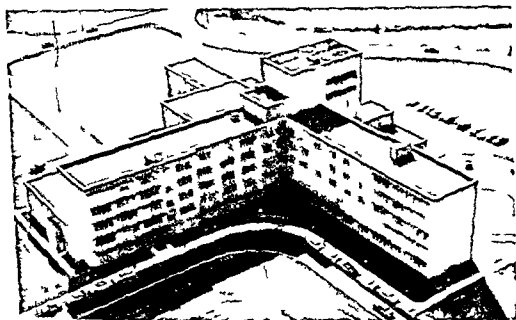
University of Oregon Medical School  
Portland Oregon

Heartiest best wishes to our distinguished staff on the occasion of the tenth anniversary of the United States Armed Forces Medical Journal. This outstanding publication has been kept at a high plane from its beginning and it has been a source of strength to the medical profession of the United States and the world.

## TENTH ANNIVERSARY GREETINGS

look it through carefully and frequently find interesting and informative material. You have my best wishes for continued success.

HOWARD P. LEWIS, M.D., PROFESSOR AND CHAIRMAN  
DEPARTMENT OF MEDICINE



U.S. Armed Forces Hospital, Andrew Air Force Base, Washington, D.C.

Pharmaceutical Manufacturers Association  
Washington, D.C.

I am delighted to have an opportunity to extend greetings to the United States Armed Forces Medical Journal on its tenth anniversary. While this may be the professional publication of the Department of Defense medical personnel, it certainly contains a wealth of material that has been enjoyed by many others, and its contributors and those responsible for them certainly deserve praise. As one who has been exposed for some time to medical literature, I hope the Journal will long be continued and will grow in ways commensurate with the growth in its recognition.

AUSTIN SMITH, M.D., PRESIDENT

### Position of Respect and Authority

University of Nebraska  
College of Medicine  
Omaha, Nebraska

May I extend hearty congratulations to the editors and staff of the U.S. Armed Forces Medical Journal as it approaches its tenth anniversary. It has established a position of respect and authority in the field of medical literature. It has served also, I believe, to develop the pride and self-confidence of the medical departments in their very sound accomplishments. It has served also to make the medical profession generally and students in the field aware of the status and performances of the medical services. Best wishes for the continued success of the Journal.

J. P. TOLLMAN, M.D., DEAN

# US ARMED FORCES MEDICAL JOURNAL

Col mb P byt ri M d e l C t  
N w Y k N w Y k

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f th p ble to f th US A m d F ce M d l Jou l The US A m d  
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ou ly ted by y t t d g p bleatio f th US A m d F e M d l  
Jo l Th e t thop d p f h y o w ll and e t d  
p cc th f t e

FRANK D S N H i M D

## Offic al Spokesman

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## TENTH ANNIVERSARY GREETINGS

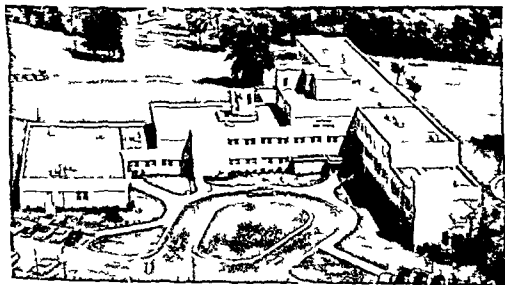
advanced for creation of additional responsible professional and interprofessional vehicles of communication. In this regard the United States Armed Forces Medical Journal has constituted an invaluable addition to the publications field. I am confident that the Journal's second decade will bring further success in its efforts to provide a representative source of information to the thousands of members of the health professions and related disciplines who wear the uniform of the country's Armed Forces.

PAUL H. JERICH, D.D.S., PRESIDENT

American Veterinary Medical Association  
Chicago, Illinois

Having heard that the United States Armed Forces Medical Journal will celebrate its tenth anniversary as the official publication of the military professional medical personnel, the staff of the American Veterinary Medical Association and its journals take this opportunity to extend congratulations and best wishes for many years of continued successful service.

D. A. IRIE, D.V.M., EDITOR IN CHIEF



Paterson Army Hospital Fort Monmouth, New Jersey

Mayo Clinic  
Rochester, Minnesota

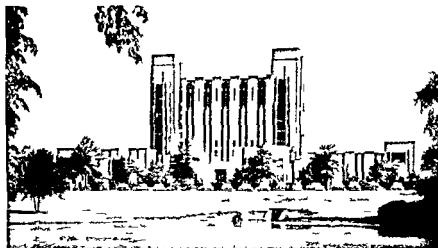
I wish to congratulate the Armed Forces Medical Journal and its editorial staff on its tenth anniversary as a professional publication of the Department of Defense medical personnel. While it is the chief function of this Journal to disseminate medical information to the military services, I feel that it has furnished still another excellent and needed service by making available to civilian groups numerous advancements in the military medical field. May I compliment you on this most excellent Journal and wish for it to continue a long and productive career.

JAN H. TILLISCH, M.D.

# US ARMED FORCES MEDICAL JOURNAL

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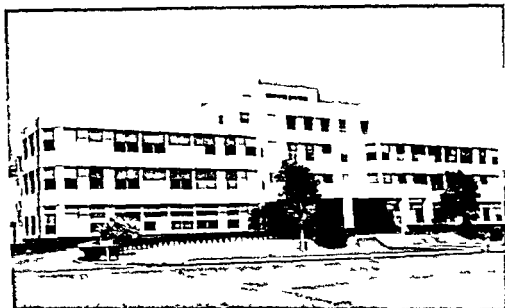
US N l Ho p t l Ph l d l ph P n n y l n

E t r n A L  
N w Y k N Y o k

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f th m t i p t t f th a t e l I th f i t t y a  
f t t th U S A m d F Md l J al by th l p t g f  
th a t l y p d g h o b g r r d t l y by u A m d  
F r e b t by p t e l l y l l f th l d s l d g l a d m y f r  
g t t t t o f l g h d l l t t b t to a b t t  
g t f th o m pl p b l m l d d p t g th l m n m h a m  
f th p l o m t t w r d w h e h t h l g l e p d l y  
p j t g k d Th Jo l i t f i t h t e d d h d d the  
p b l m d p t d th s o l t f d e l p d t t t t  
p d l th th t l h d t e d I m f i d t t w l e  
m l b l f t i c o m pl g d d s t b t n g th p o f l

medical guidance upon which the welfare of man depends in this vast area of limitless opportunities which awaits our adventure into outer space. To those who conceived the vital mission of the Journal as well as to those who have so fruitfully labored in its production go my heartiest congratulations on the occasion of its tenth anniversary issue and with all good wishes for continuing progress in the years ahead.

E. V. RICKENPACKER, CHAIRMAN OF THE BOARD



U. S. Armed Forces Hospital, Ramey Air Force Base, Puerto Rico

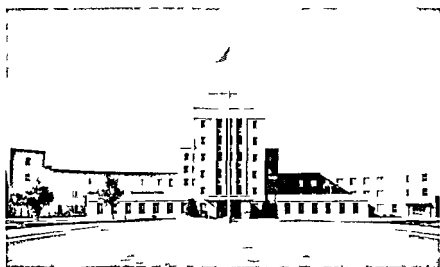
Department of Health, Education, and Welfare  
Washington, D. C.

During the ten years in which the United States Armed Forces Medical Journal has been published it has served a very important mission and is deserving of sincere congratulation. We all realize that fundamentally there is little difference between civilian and military medicine and yet there are certain areas of specialization in both which need to be treated and which are of universal interest. The Armed Forces Medical Journal has brought to civilian medicine certain problems with which military medicine has been faced as well as the result of research activities and has kept the members of military medicine informed concerning new discoveries and methods developed in civilian medical and research centers. Since the rotation of young physicians through the Armed Forces medical department became established, an increased interest in military medicine has been evident throughout the medical profession and a closer relationship has been nurtured between military and civil medicine which has contributed to and will continue to contribute to the medical background of the coming generation of physicians. Congratulations to the entire editorial board of the Armed Forces Medical Journal and may they continue to support a program which will fill a much needed place among medical periodicals.

WINCHELL MCK. CRAIG, M.D.  
SPECIAL ASSISTANT TO THE SECRETARY

Vangua d of Med cal Progress

Al gt V g  
Th t th r f th U t d St t A m d F M d l J m l  
at h d l w i th N B f M d d S g y at th t m f  
t b th d e q tly l l t t d i t l f t t t l p b l t n  
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d h e b t g t f i d t l th l g l s t d d f e l l th t h  
b e m t d i v t t b t d b y t d t P b l h o r p e h  
t p r t i c l l th f i l d f l l i t t l t e l h e p p l b l n  
t m b l m t l l f i l d f m d l d I t h f o r l g b e  
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p n t t th g d f m e d l p g Th J u a l n l k  
t d p l a s g I t f t o t f m t a n d i t t y p g p h v l l d  
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u p n w h m t l r t l d l e d d t t h o u p o w h m t e e t y d l v  
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L A M O T P U H R R A D M C U S N ( R )



U S N l H p t l St Alb n N w Y k

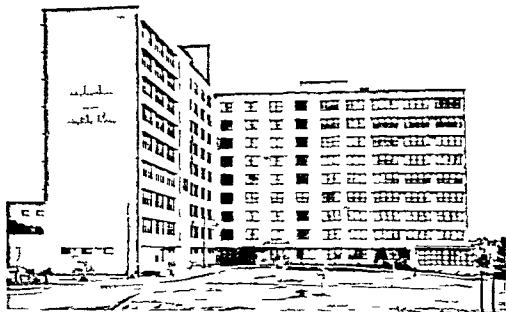
Unexcelled Coverage

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## TENTH ANNIVERSARY GREETINGS

people and event which are of interest to its readers has been unexcelled. On behalf of the Association I also want to express our appreciation to the Journal for making its pages available for the monthly The 1 Year AMA which is prepared by our Council on National Defense. This is an important medium by which the Association maintains contact with its more than 13,000 members in the military service. Our interest in the problems of the military physician has been a long and continuing one and we are grateful that our task has been made easier by the fine cooperation of the Surgeon General which we have always enjoyed. I assure you that the American Medical Association through our Council on National Defense will continue its interest in military medicine and in the U.S. Armed Forces Medical Journal as a consistent and effective professional publication dedicated to the advancement of the high purposes of Armed Forces medicine.

LOUIE M. ORR, M.D., President



Womack Army Hospital Fort Bragg North Carolina

The Institute of Living  
Hartford Connecticut

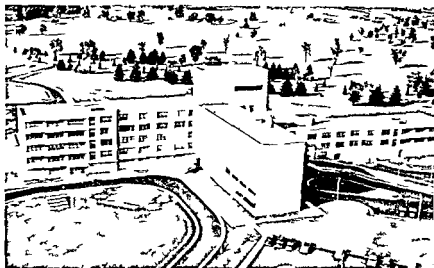
May I add my greeting to the many which you will receive at the tenth anniversary of the United States Armed Forces Medical Journal. I have always been impressed by the professional spirit which is reflected in the preparation of the article for publication in the Journal. Also I am aware of the fact that the articles have been carefully selected for publication was decided upon. I am glad to be with the staff of the Institute of Living and the practical in which they are all doing. I like to comment upon the new frontiers of the Journal. May I



# US ARMED FORCES MEDICAL JOURNAL

t d t y u d y o t f f a d l l c d m y l t t o g a t l t n  
m y b s t h f t h f t o f t h A m e d F o c M d c l J l

F A N C I S J B R A L R A R A M I A L M C U S N



U S A F H o p t l W g h t P t t n A F B D y t n O h o

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p b l m c o e g h g l l t t d d e b y t h d c l d p t t o f t h  
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C R S M K P s i n

## Distinguished Contribution

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W h g t D C

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o f t h t t l v f t h U t d S t t A m d F r M d a l J o r n  
D r g m y t r S g G e l f t h l b l e H l t h S I h e b  
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I m f i n l d t h a t t h p t l t h p w h h h a l

## TENTH ANNIVERSARY GREETINGS

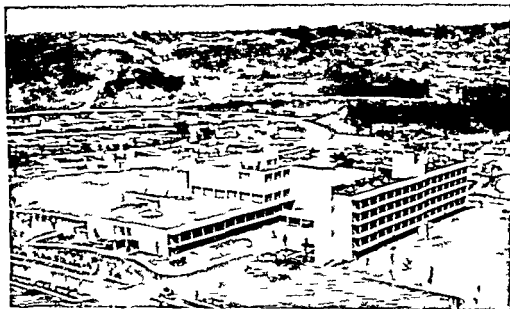
existed among the military and civilian health resources of our Nation are responsible in large measure for the excellent health our people enjoy. During its 10 years of existence to date the United States Armed Forces Medical Journal has made a distinguished contribution to contemporary medical literature. I know that it will maintain its standard of excellence in reporting the development of future decades.

THEODORE BURNEY, M.D. SURGEON GENERAL

Radio Corporation of America  
New York New York

Cordial good wishes and congratulations to you and the staff of the Journal on its tenth anniversary of distinguished service to military medical progress.

DAVID SARNOFF BRIGADIER GENERAL USA (RET)



U S Army Hospital Camp Hue Okawa

United Mine Workers of America  
Welfare and Retirement Fund  
Washington D C

Warmest congratulations upon the tenth anniversary of the United States Armed Forces Medical Journal. The scientific articles and other material in the publication are read with much appreciation by the medical members of our staff, most of whom have been concerned with military medicine at one time in their lives. There is much of value also in the general field of medicine. My best wishes for continued success and expansion in the splendid contribution which your Journal is making.

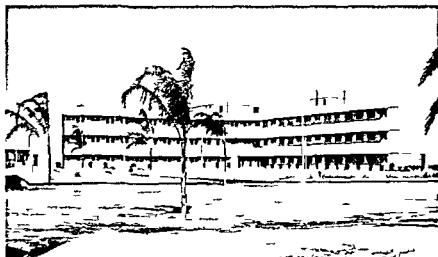
WARREN F. DRAPER, M.D. EXECUTIVE MEDICAL OFFICER

# US ARMED FORCES MEDICAL JOURNAL

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Idd t al th t th US Arm d Fo Md l J l h d compl t d  
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a d q t e l y t th p f e s t l g The US Arm d F e s M d l J l

## TENTH ANNIVERSARY GREETINGS

has performed this function admirably and with distinction. We in psychiatry are grateful and wish you all possible success as you enter your second decade.

WILLIAM MALAMUD M.D. PRESIDENT

### Medium of Education

Student American Medical Association  
Chicago, Illinois

The Student American Medical Association and its official publication *The New Physician* take great pleasure in paying tribute to the tenth anniversary of the United States Armed Forces Medical Journal. The excellence of its format, the high caliber of its teaching material, and the readability of its editorial presentation set an enviable goal for those of us in the medical publishing field to follow. Military medicine is still medicine, and those of us outside the military field are grateful for the opportunity to share the Armed Forces' clinical findings and research, almost all of which can be applied to private practice. We wish your Journal continued success in its exemplification of the professional achievements of our Armed Forces.

W. R. HIRKHAM, PRESIDENT



U. S. Naval Hospital, San Diego, California

American Academy of Occupational Medicine  
New York, New York

I should like to extend my greetings on the occasion of the tenth anniversary of the United States Armed Forces Medical Journal. In doing this I speak for the American Academy of Occupational Medicine and also for myself as a retired officer of the U.S. Naval Reserve. The Armed Forces Medical Journal serves at least two valuable purposes. One is to stimulate research on the part of the medical officers by offering a medium for publication, and the other is educational by publishing results of various studies of interest in military medicine. The scientific level of the articles published certainly compares favorably with any of the professional journals. Please accept my congratulations to the Journal and our best wishes for successful continuation.

LEONARD J. GOLDWATER, M.D., PRESIDENT

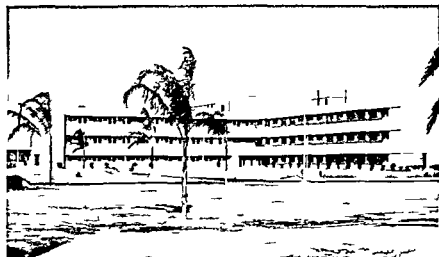
# US ARMED FORCES MEDICAL JOURNAL

Ochs n r Cl

N O l L

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t h J u a l d t h k t h t y o u r d t l p o l e v l l t E y t h  
m d e l p o f i o c n b e j t l y p u d o f y o f f t s

A n O c h s n M D



U S A l F o H p t l M D H A F B T m p F l d

T Chld H p t l  
H o t o T a

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m t m p e s

R r s J B L M D P h i c r C n

A m l y h t e A t  
W h g t D C

I t p l t t d o g t l t o t t h A m d F e s M d e l J r n l  
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p g f m d l p g i t g t t m n t d h I t f l e  
m t y n d f d m t l m p t n t h t m l t y m d e h u l d b p t d  
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## TENTH ANNIVERSARY GREETINGS

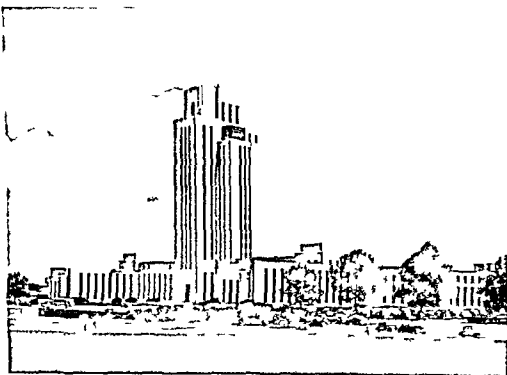
Please accept my congratulations on your past achievement and my best wishes for the success which I know you will continue to achieve in the future.

C V RALST REAR ADMIRAL, DC USN (RFT)  
DEAN SCHOOL OF DENTISTRY

Emory University Clinic  
Atlanta, Georgia

I am deeply appreciative of the opportunity of seeing the monthly publications of the U.S. Armed Forces Medical Journal. I am impressed with the caliber of the medical articles presented, a few of which show original work and observation, all of which are good clinical studies and useful to all those interested in the progress of art and science of medicine. I am particularly pleased that the quality of this journal reflects the high caliber of the medical service of the Armed Forces. You are to be congratulated on getting out such an effective publication.

R HUGH WOOD, M.D.



U.S. Naval Hospital Bethesda, Maryland

Fort Tennessee

Permit me to congratulate you on the tenth anniversary of the U.S. Armed Forces Medical Journal. It is particularly pleasing to reflect the continuing of the separate publication of the U.S. Armed Forces Medical Journal from the past into an excellent, outstanding publication. It is a privilege of me to

# U S ARMED FORCES MEDICAL JOURNAL

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 h ll i pla f Th J l t l t g t loes t g  
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 Am f p na l t t est d n th l b th hood f m Let  
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 t fi p pers th J l d w th th t e t g t m bo t th l d rs  
 th Arm d l es med l e e

EL R H MD

## For Discriminating Readers

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## Required Reading

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## TENTH ANNIVERSARY GREETINGS

are of a special value because of their dealing with clinical problems in the field of orthopedic surgery. I am sure that your medical office has added to its list the great majority of those who are now so actively engaged in the study of the United States Armed Forces Medical Journal and its recommendations.

JOSEPH S. BARR, M.D. CHIEF ORTHOPEDIC SURGEON

St. Louis, Missouri

The U.S. Armed Forces Medical Journal is to be celebrated on its tenth anniversary—the professional medical publication of the Department of Defense. Primarily intended for personnel of the medical department of the Armed Forces, it nonetheless is a valuable reading for the civilian physician. Not only may the latter group take abreast of some of the experimental and clinical research being carried out within the framework of the medical department but valuable information may be obtained for clinical application in the hospital practice of medicine among the citizen of this country. The U.S. Armed Forces Medical Journal is must reading for personnel of the medical department of the Armed Forces and is highly recommended reading for members of the civilian profession.

OSCAR L. HARTMAN, JR., M.D.

### Keeping Pace

Duke University Medical Center  
Durham, North Carolina

I wish to join with the many other admirers of the United States Armed Forces Medical Journal on its tenth anniversary. This journal has been of inestimable value not only to those of us interested in military medicine but also to the faculty and student of Duke University Medical Center who frequently read this Journal and use the pertinent information which it contains. In addition, the U.S. Armed Forces Medical Journal through the authors of the articles give me an opportunity to keep up with my friends in the service.

W. C. DIXON, M.D. DEAN

Joint Commission on Accreditation of Hospitals  
Chicago, Illinois

Medicine is not an exact science but still an exacting one. As medical science advances, the medical profession must try and keep pace. One of the best means of accomplishing this is through the reading of well written articles in professional publication. The United States Armed Forces Medical Journal has proven its ability to fulfill this mission capably on the part of its authors and it is hoped that it will continue to do so. Congratulations on your tenth anniversary year for a job well done.

KENNETH B. BABCOCK, M.D. DIRECTOR

University of California Medical Center  
Los Angeles, California

Please accept my greetings and congratulations on arriving at the tenth anniversary of the U.S. Armed Forces Medical Journal. Your Journal covers a very useful field for student, educators and practitioners in the reporting of diseases and observation often not found elsewhere in the literature.

STAFFORD L. WARREN, M.D. DEAN, SCHOOL OF MEDICINE



# Military Medical News

## ADM KERN NAMED PRESIDENT OF MILITARY SURGEONS 66TH ANNUAL CONVENTION AWARD WINNERS ANNOUNCED

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Health Bethesda Maryland received the Stitt Award presented by the Pfizer Laboratories for his many contributions in microbiology and immunology. Winner of the Major Louis Livingston Seaman Prize was Robert Rugh PhD a associate professor of radiology at Columbia University New York for his article Ionizing Radiations—Their Possible Relation to the Etiology of Some Congenital Anomalies and Human Disorders. Robert Van Reen PhD a chemist at the Naval Medical Research Institute Bethesda Maryland received the McLester Award given by the J. B. Roerig Company Division of Charles Pfizer & Company Inc for his work in the field of applied nutrition and dietetics.

The Founders Medal given annually by the Association of Military Surgeons for an outstanding contribution to military medicine and for meritorious service to the Association was presented to three members. Vice Admiral Thomas J. Cooper MC USN (Ret) former commanding officer of the National Naval Medical Center Bethesda Colonel Aubrey J. Jennings USAF MC director of professional service Office of the Air Force Surgeon General and Colonel Frank M. Townsend USAF MC director Armed Force Institute of Pathology, Washington DC.

The second annual Sustaining Membership Award presented by the chairman of the Sustaining Membership Group to a member of the Federal Medical Services who has made some



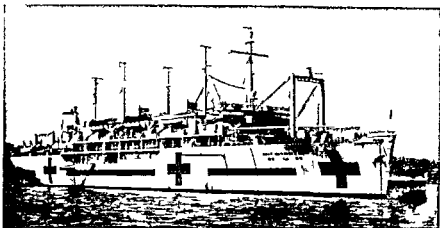
Vice Admiral Cooper



Col. Jennings



Col. Townsend



PROJECT HOIF The USS Comfort (LST-1186) is a hospital ship  
 hoisted the United States flag on 15 July 1960  
 from the shipyard at the Naval Shipyard, Groton, Conn.  
 designed to transport and treat up to 1,000 patients  
 and 150 medical personnel. The ship is equipped with  
 150 hospital beds, 100 operating tables, and 100  
 X-ray machines. It also has a laboratory, a pharmacy,  
 and a dental clinic. The ship is crewed by 150  
 personnel, including medical and support staff.

## Officers Certified By Specialty Boards

The following officers are certified by specialty boards:  
 Medical: 10  
 Dental: 10  
 Pharmacy: 10  
 Radiology: 10  
 Pathology: 10  
 Anesthesiology: 10  
 Surgery: 10  
 Internal Medicine: 10  
 Pediatrics: 10  
 Obstetrics and Gynecology: 10  
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 Emergency Medicine: 10  
 Forensic Medicine: 10  
 Sports Medicine: 10  
 Occupational Medicine: 10  
 Public Health: 10  
 Preventive Medicine: 10  
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 Epidemiology: 10  
 Health Services Research: 10  
 Medical Administration: 10  
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 Medical Review Board: 10  
 Medical Appeal Board: 10  
 Medical Arbitration: 10  
 Medical Mediation: 10  
 Medical Conciliation: 10  
 Medical Negotiation: 10  
 Medical Dispute Resolution: 10  
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# Progress Notes

Captain William M. Silphant MC USN former director of the Armed Forces Institute of Pathology was promoted to rear admiral on his retirement 31 October. Colonel Marc H. Flinter MC USA former medical advisor to the 2d Chinese Field Army on Taiwan has succeeded Lieutenant Colonel Martin Lutner MC USA as commander of the U.S. Army Hospital at Fort Jay, New York. Among the members of the consulting, editorial board of the new *Journal of Nuclear Medicine* Captain I. R. Larling MC USN U.S. Naval Hospital Bethesda, Maryland. Colonel Warren C. Felan MC USA chief of the bacteriology and immunology branch Armed Forces Institute of Pathology retired 31 October after more than 20 years of active service. Captain William S. Francis MC USN commanding officer of the U.S. Naval Dispensary, Mare Island, California has been elected a fellow of the American College of Preventive Medicine.

Major Jerom H. C. C. MC USA of the Army Surgeon General's office has been named as the first participant in a new training program at the Calcutta School of Tropical Medicine and Hygiene in India where he will serve as a resident observer for 3 months. Future pace will be rotated among Army intern preventive medicine officers and other clinical specialists. Captain Joseph A. Svirid MC USN is the new chief of urology at the U.S. Naval Hospital Philadelphia reporting from a similar position at the U.S. Naval Hospital Portsmouth, Virginia. An Army student nurse Miss Frances J. M. L. is a junior at Arizona State University School of Nursing has been elected president of the Arizona Association of Student Nurses. Colonel Joseph I. B. DC

USA chief of the oral pathology division Armed Forces Institute of Pathology has been appointed to a special advisory committee by the State Commission of Health for New Jersey to study the long term effect of body burns caused by radium and other radioactive material. Lieutenant Francis R. Bolik MSC USN, has been appointed laboratory division officer of the U.S. Military Medical Supply Agency, Brooklyn, New York. Howard Le. Saulerlich Ph.D. formerly associate professor of animal husbandry at Iowa State University has been appointed chief of the chemistry section U.S. Army Medical Research and Nutrition Laboratory Fitzsimons Army Hospital, Denver. Captain Robert B. W. DC USN U.S. Naval Dental Research Facility, Great Lakes, Illinois has been elected president elect of the American Academy of Gold Foil Operators for 1959-60.

Rear Admiral C. W. Selant DC USN chief of the dental section Bureau of Medicine and Surgery conferred in Washington with the Prime Minister of New Zealand the Right Honorable Walter Nash P.C. recently to discuss work being done by Captain Fred L. L. DC USN at the University of Otago Dental School, Dunedin, New Zealand at the request of the New Zealand Government. Dr. Donald F. G. medical officer in the Department of Cardiology, Walter Reed Army Medical Research was formerly in Civilian Service for his contribution. Captain B. F. DC USN has been elected president of the American College of Surgeons. Colonel J. B. AMSC Medical

# U S ARMED FORCES MEDICAL JOURNAL

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## ACCREDITED HOSPITALS

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# The Medical Officer Writes

## Articles Published in Other Journals

### U S Army

EVALUATION OF THE TRYPANEMA PALLIDUM IMMOBILIZATION TEST OF SERUM AND CEREBROSPINAL FLUID Major R. I. Anderson MSC USA Walter Reed Army Institute of Research and J. I. Went Ph.D. *American Journal of Clinical Pathology* September 1959

COMPLICATED REGIONAL ENTERITIS Major I. Arismendi MC USA Major J. L. Hannon MC USA Colonel H. T. Bernal MC USA and C. B. Mathewson Jr. MD Letterman Army Hospital San Francisco *California Medicine* August 1959

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IONIAZID AND PARA-AMINOSALICYLIC ACID TOXICITY IN MICE A STUDY INCLUDING HIGH DOSE OF INH AND CATIONIC INTOLERANCE TO PAS Lieutenant Colonel S. J. Berte MC USA and Major H. J. Dewlett MC USA Valle Forge Army Hospital Phoenixville Pa. *Diseases of the Chest* August 1959

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LABORATORY TESTS OF TYPHOID VACCINE USED IN A CONTROLLED STUDY G. E. H. MD MC Carlson S. B. Formal Ph.D. and Lieutenant Colonel A. S. Benenson MC USA Walter Reed Army Institute of Research *Bulletin of World Health Organization* June 1959

THE NEED FOR X-RAY STUDY OF THE FOPPEL PATIENT Lieutenant Colonel R. W. Finchbaugh DC USA Fort Fust Va. *Dental Digest* July 1959

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HENRY SEND A CHOPPER! Capt. in C. O. Greer Jr. MSC USA US Army Aviation School Fort Rucker Ala. *US Army Digest* October 1959

INTRACUL THROMBI AND THE INTENSIVE FACTOR OF IRREVERSIBLE SHOCK Colonel R. M. Hardaway MC USA US Army Hospital Fort Belvoir Va. and D. G. McKay MD US Army Hospital Frankfurt Germany *Annals of Surgery* August 1959

THE DEBT WE OWE TO THE VOLUNTEER Major General S. B. Hay MC USA Surgeon General US Army *Life and Health* October 1959

IDENTIFICATION OF BARBITURATES BY PAPER CHROMATOGRAPHY R. Hilf Ph.D. G. A. Laithour MS and F. F. Castano Ph.D. 6th US Army Medical Laboratory Fort Baker Calif. *Journal of Laboratory and Clinical Medicine* August 1959

This department is intended to provide a place for the publication of articles of interest to the medical service of the United States Army. It is not necessary to submit articles for publication. This list is gleaned from the files of the department. The editor is not responsible for the accuracy of the information published in this department.

# US ARMED FORCES MEDICAL JOURNAL

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## US Navy

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- BLOOD DYSCRAZIA ASSOCIATED WITH TOLBUTAMIDE THERAPY** Lieutenant R C Brod MC USA US Naval Hospital Philadelphia *Journal of the American Medical Association* September 1959
- THE EFFECT OF TEMPERATURE ON TOLERANCE TO POSITIVE ACCELERATION** Commander B F Burges Jr MC USA Aviation Medical Acceleration Laboratory US Naval Air Development Center Johnsville Pa *Aerospace Medicine* August 1959
- HYPERTENSION, PREGNANCY AND PHEOCHROMOCYTOMA** Captain C I Calv MC USA Lieutenant M F Re-nick MC USA Lieutenant D R Knab MC USA and Captain J F Richardson MC USA US Naval Hospital St Alban NY *Journal of the American Medical Association* September 1959
- ADULT STAPHYLOCOCCAL PNEUMONIA** Lieutenant J A Cold MC USA and Lieutenant J W Davis MC USA US Naval Hospital Bethesda Maryland *Medical Annals of the District of Columbia* July 1959
- HYPEROTOPIA OF THE MANDIBLE** Captain H G Green DC USA US Naval Hospital Camp Pendleton Calif *Oral Surgery* August 1959
- SARCOMA BOTRYOIDE ACUTE REPORT** Captain H H Hill MC USA Commander T B Lebbertz MC USA and Lieutenant F B McMahon MC USA US Naval Hospital Bethesda Maryland *American Journal of Obstetrics and Gynecology* September 1959
- URENDRIPABLE ARTERIOLE OF FIBRINOGEN** Lieutenant M C Harrer MC USA and Commander T B Lebbertz MC USA US Naval Hospital Bethesda Maryland *Medical Annals of the District of Columbia* July 1959
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- IDENTICAL BILATERAL ORAL CARCINOMA** Captain T A Leone DC USA US Naval Hospital San Diego Calif *Otolaryngology* July 1959
- CARDIAC ARREST AND CARDIAC RESUSCITATION** Commander J F McClenathan MC USA and Lieutenant Commander F J Rupnik MC USA US Naval Hospital Bethesda Maryland *Medical Annals of the District of Columbia* July 1959
- REHABILITATION—PLASTIC PROTHESIS** Captain A J Numan DC USA US Naval Dental School Bethesda Maryland *Military Medicine* September 1959
- SUBCUTANEOUS MEDIASTINAL AND PROBABLE SUPRACARDIAL EMPHYSEMA TREATED WITH RECOMPRESSION** Lieutenant J C Norman MC USA and Lieutenant P J Rozolo MC USA US Naval Submarine Base Naval Station London Conn *New England Journal of Medicine* August 6 1959
- BICIPITAL TENDONITIS** Lieutenant K F Spence Jr MC USA US Naval Hospital Bethesda Maryland *Medical Annals of the District of Columbia* July 1959

## U S Air Force

- WE'VE MADE CHILDREN WELCOME** Captain L Berlow USAF MSC USA Air Force Hospital Wright Patterson Air Force Base Ohio *Pediatrics* August 1959
- QUANTITATIVE ESTIMATION OF URINARY METABOLITE OF ADRENALINE AND NORADRENALINE AS POSSIBLE INDICATION OF TOLERANCE TO GRAVITATIONAL**



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## Monthly Message—co t d from p

The enactment of the Medical and Dental Officer Career Incentive Act Public Law 49 in 1956 was a further step taken to alleviate the situation and build up the strength of the Regular Medical and Dental Corp. In the 1954-1959 period the average resignation rate among the services for Regular officers declined Medical from 1.5 to .3 and Dental from .3 to .05. In the same period applications for Regular officers commissions have increased Medical Corp from 3,12 to 4,87 and Dental Corp from 1,369 to 2,065.

Thus today—because of the various programs instituted—the need of the Armed Services can largely be met both by true volunteers and by the group of obligated volunteers who realize that the special draft is still available provided these requirements cannot be met by the other programs.

*Frank B Berry*

FRANK B BERRY MD  
 Assistant Secretary of Defense  
 (Health and Medical)

## Book Reviews

**DISEASES OF MEDICAL PROGRESS: A Survey of Diseases and Syndromes Unintentionally Induced as the Result of Properly Indicated Widely Accepted Therapeutic Procedures** by *Robert H Moser* BS MD Major Medical Corp U S Army with a foreword by *F Dennette Adams* MD 131 pages Charles C Thomas Publisher Springfield Ill 1959 Price \$4.50

The rather confusing title of this book is clarified by the subtitle. It is a review of the literature that the author encountered from 1930 through 1958 reporting cases answering the criteria stated in the subtitle. It is not intended to be comprehensive but merely a sampling of the material which the average internist might see. The text contains 15 brief chapters which divide the material into disorders induced by various type of therapies as well as into the various organ systems involved. The text contains a total of only 58 pages. The bibliography contains 107 references and occupies an additional 58 pages. Finally there is a very adequate index. Actually the average reader will probably not learn a great deal from the book in the sense that there is little he will not recall having heard or read of if not seen. However it is clearly and pleasantly written and may serve as a valuable reminder of possible untoward effects of many commonly employed drugs and other therapeutic procedures. The text itself is not comprehensive enough to serve as a reference work however the extensive bibliography may be a useful adjunct in this respect.

CAPT JAMES L SPENCER MC USA

**BORN ERRORS OF METABOLISM** by *David Yilung Hsia* MD 338 pages Illustrated Year Book Publisher Inc Chicago Ill 1959 Price \$9.50

This rather unique book presents a fresh approach to a number of metabolic diseases which in the past were considered to have nothing in common other than that they were poorly understood. Dr Hsia has outlined with adequate discussion more than 90 diseases in which there is definite evidence of hereditary background. After a brief discussion of the science of genetics and the general problem of hereditary transmission of disease the author proceeds in a clear logical manner to group and discuss such maladies as the hemoglobinopathies, tyrosinemia, Fanconi's syndrome, porphyria, hemophilia, diabetes, inborn errors of metabolism, and many others too numerous to mention here. Following the discussion of each item is a convenient brief up-to-date bibliography. In the appendix are described 4 diagnostic laboratory procedures for quick reference. This book is of particular value to those physicians who desire to implement their knowledge and systematize their thinking concerning the hereditary aspects of many important diseases.

CAPT ROBERT J WHIPPLE, MC USA

**CANCER, DIAGNOSIS AND TREATMENT** edited by *John B Field* MD PhD with 8 contributors 796 pages Illustrated Little Brown & Co Boston Mass 1959 Price \$18.00

The oft recurring medical mystery of why something was not done before is raised by the publication of this single volume on cancer prepared especially



## BOOK REVIEWS

**OFFICE ORTHOPEDICS** by *Jewis Cozen MD FACS* 3d edition 430 pages illustrated Lea & Febiger Philadelphia Pa 1959 Price \$9 50

This volume the third revision and reprinting since 1950 presents as its title implies a review of practical and worthwhile procedures that may be used in the orthopedic office and in outpatient clinics. The illustrations are adequate and most of them are of definite descriptive and teaching value. The book is written in an inviting style that gives it easy readability and sustained interest. Although not a textbook of advanced orthopedic surgery it fills a definite need for a basic fundamental text on common understanding of everyday orthopedic diagnostic problems their recognition and where possible their simple treatment. Many of the 33 chapters give a stimulating systematic review of basic orthopedic pathology for example the chapters on limp and on crooked back in childhood and those on painful arm and leg deformed arm and leg and weak arm and leg in adults. The listing of pathologic conditions is concise and thorough and the bibliography at the end of each section is extensive. The historical background of all subjects is considered briefly. This volume can be highly recommended for all orthopedic residents in training. It is an excellent reference volume and many of the diagnostic and therapeutic tips are worth remembering. In summary it is a most readable concise stimulating volume for the orthopedist as well as for the general surgeon and general practitioner.

COL HAROLD S MCBURNEY MC USA

**PATHOLOGIC PHYSIOLOGY OF ORAL DISEASE** by *Richard W Tiecke BS DDS MS FACC* *Orion H Stuterville BS DDS MDS MD* and *Joseph C Clandra MD PhD* 480 pages illustrated C V Mosby Co St Louis Mo 1959 Price \$11 50

This oral pathology text in its first edition is coauthored by an oral pathologist a maxillofacial surgeon and a general pathologist. This broad background of experience provides a welcome addition to the enlarging group of oral disease texts. The preface states that only generally accepted theories related to the etiology of disease will be included. This position carefully followed in the basic material gives the book a refreshing quality. The reader will note with pleasure the lack of confusing controversial discussion. Occasional conflicting statements such as the synonymous interchange of the terms hypertrophy and hyperplasia during the discussion of dilantin effects upon the gingiva do not detract from the merit of this volume. Its greatest value lies in the tabulations summarizing disease etiology clinical features laboratory findings and treatment at the end of each chapter. Such tables will permit the reader to correlate and cement in his mind the sufficiently detailed material in the text. The usual and relatively frequent oral disorders are well covered without verbosity. The organization and continuity of material are good. The major defect is the paucity of suitable photomicrographs to illustrate the various lesions. The technical quality of those included is sometimes short of desirable as well as is the insufficient magnification in certain lesions. The clinical illustrations and radiographs are well reproduced and are sufficiently numerous to augment the reading material. The bibliography is adequate and recent with important review articles included. This text will be of great value to general dentists and to members of the various dental specialties. Its usefulness as a teaching text for dental students cannot be overrated. Physicians who desire a ready reference to oral disease in their practice also will find this book useful.

MAJ WILLIAM G SPRAGUE USAF DC

# New Books

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UNITED STATES

# *Armed Forces Medical Journal*



February 1960

VOLUME 11

NUMBER 2



# INFORMATION FOR READERS

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UNITED STATES

# *Armed Forces Medical Journal*

VOL. 11 NO. 2 FEBRUARY 1960

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# Monthly Message

## Medical Education for National Defense (MEND)

The origin of the Medical Education for National Defense (MEND) Program dates back to 1951 with the appointment of a committee by the Association of American Medical Colleges to consider methods whereby material from the armed services could be made available to the medical schools research toxicology preventive medicine pest control epidemiology field aviation and submarine medicine and environmental factors and human engineering—all of special import to the military and in some instances unique to the services. The committee consulted with the Department of Defense and in 1952-1953 five medical schools were selected for a pilot project with \$15 000 allotted to each. Many of the schools feared that this would entail extra hours added to their overburdened curricula and that there would be dictation of subjects therefore the program languished and it was difficult to obtain supporting funds. In the early days the program was carried out largely through the efforts of Dr Stanley Olson Dean at Baylor and Brigadier General (then Colonel) Sheldon S Brownton USAF MC of this office as chairman of the federal committee.

In 1954 the program was reoriented. It was realized that the former ROTC program which was current in the medical schools required personnel from the military in those that accepted it it reached comparatively few students it added hours to the curricula of the schools and was primarily an expensive procurement program. A MEND Program however which was acceptable to the schools would reach all of the students would not require allocation of military personnel at the schools would not be essentially a procurement program and would be much cheaper in cost. This has proved to be the case. Therefore the program was changed and medical schools were added upon application at the rate of not more than 10 a year with a member of the faculty in each school accepting the responsibility of coordination.

Numerous trips are made throughout the year and symposia are held at such places as Walter Reed Army and National Naval Medical Centers. Federal Civil Defense operations are witnessed lecturers are provided and the group from the various schools visit military installations to learn about problems peculiar to military medicine and civil defense. On return to their schools they include into their own courses what they wish of what they have seen and heard.

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## Foreword

The *United States Armed Forces Medical Journal* is a monthly publication of professional and administrative information for medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the United States Army, Navy, and Air Force invite members of the regular and reserve medical services, the professional consultants of the military departments, and other physicians and health scientists with an interest in Department of Defense activities to submit manuscripts for publication in this *Journal*.

FRANK B. BERRY, M.D.

*Assistant Secretary of Defense*

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*Surgeon General, United States Air Force*

The establishment of the project was a result of foresight on the part of several officers in the medical services. Major General Otis O. Benson Jr. USAF MC contacted Brigadier General John R. Wood, USAF MC in August 1948 to inquire whether our laboratory could undertake research on the dangers of propellant fuels in present and prospective use. About the same time General Wood received a letter from the Navy asking for similar investigations of hydraulic fluids. General Wood thought that a joint project would best answer the several needs and so he arranged for a conference which was held in Washington in October 1948. At that meeting representatives of the Air Force, Navy, and Army informally agreed on a plan for our laboratory to investigate the health hazards of propellant fuels. To formalize the agreements, a project was drawn up and submitted to the Chemical Corps Technical Committee and in March 1949 Project No. 4-16-17-01, Health Hazards of Propellant Fuels and Casualty Treatment Therefor, was approved with a priority of 1B.

General Wood had been so certain of approval that he had the laboratory work well under way in late 1948. In this critical period of fiscal year 1949, one of his notable achievements was to obtain from the Chemical Corps \$739,000 for the additions to our laboratories that were necessary to the program. This insured our capability, as far as facilities were concerned, to undertake the toxicologic, physiologic, pathologic, biochemical, and pharmacologic studies contemplated.

By May 1949 it was clear that there would be a continuing need for research not only on propellants but also on a wide variety of other chemicals used or being considered for use by the military services. A new project No 4-61-14-00<sup>2</sup> Health Hazards of Military Chemicals was approved by the Chemical Corps Technical Committee on 18 July 1949. At that time it was estimated that 35 people and \$240 000 a year would be required apart from post support and other overhead expenses provided by the 2nd Army. The financial support and personnel spaces were not immediately forthcoming—funds obtained in fiscal year 1950 amounted to \$1.8 000 and it was not until March 1950 that an allotment of 15 additional personnel spaces needed to complete the complement was granted.

Three major conferences have been held. The first held at Army Chemical Center in April 1950 and reported in Medical Division Special Report No. 3. Conference on Health Hazards of Military Chemicals Program. was attended by many in the military services.

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## Toxicity of Propellant Fuels and Oxidizers

DAVID B DILL PH D

KEITH H JACOBSON PH D

A SYSTEMATIC STUDY of the toxicology of propellant fuels and oxidizers as well as of other potentially toxic materials of defense interest was widely recognized in the late 1940's as a prerequisite to the adequate solution of problems of environmental medicine resulting from new defense technology. Information on the toxicity of these chemicals and on the mechanisms of their toxic action as well as development of hygienic standards and procedures for detecting and treating toxic injury was clearly required if some of the newer propellants hydraulic fluids and fire extinguishers were to be safely handled. In some cases discovery of a high degree of toxicity of a specific chemical would be sufficient cause for dropping that material from the development cycle and searching for a less toxic substitute.

In searching for a laboratory of sufficient size within the Department of Defense it became clear that the staff and facilities for research in biochemistry pharmacodynamics toxicology pathology and clinical research were already present in the Medical Division at the Army Chemical Center, Maryland. Two projects ensued and have resulted in studies of a large number of compounds such as aniline, furfuryl alcohol hydrazine 1,1-dimethylhydrazine (UDMH) methyl hydrazine diborane pentaborane decaborane red fuming nitric acid chlorine trifluoride and 90 percent hydrogen peroxide among the propellants and such as trifluoromonobromomethane and difluorodibromomethane among the fire extinguishers. The results of these investigations have been published in many original scientific reports in addition, reviews technical bulletins, and safety and health manuals have been based in part on these scientific and technical reports.

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From the US Army Chemical Warfare Laboratories Army Chemical Center Maryland. Presented on April 28 1960 at the 30th annual meeting of the Aerospace Medical Association Los Angeles Calif





## TOXICITY OF PROPELLANT FUELS AND OXIDIZERS

University of Pittsburgh which has performed investigations under contract with our laboratory and through the Callery Chemical Company with the US Navy Bureau of Aeronautics

One class of these borane fuels is represented by HEF-2 and another by HEF-3 and H<sub>1</sub>Cal-3. They are made up of compounds containing boron and hydrogen and offer more energy per unit weight than the more commonly known hydrocarbon fuels such as gasoline and JP fuels. However while the hydrocarbon fuels offer only a slight toxicologic hazard as evidenced by many years of safe handling guided more by respect for their fire hazards than for their toxic hazards the boron based fuels are highly toxic as well as flammable.

These fuels like the better known boron hydrides pentaborane (B<sub>5</sub>H<sub>9</sub>) and decaborane (B<sub>10</sub>H<sub>14</sub>) have a complex action involving the central nervous system cardiovascular functions and metabolic pathways. Large doses affect the central nervous system as evidenced by tremors and convulsions. Small doses have a depressant action. In animals to whom these fuels have been administered blood pressure first increases and later decreases to shock levels this is usually followed by death. A pronounced hyperglycemia is frequently seen in experimental animals but the toxicologic significance of this effect is not well understood at present.<sup>16</sup> In some experiments with isolated rabbit hearts perfused with HEF-3 there have been significant decreases both in rate and in amplitude of cardiac contraction. Attempts to reverse these effects have not been highly successful although intra cardiac injections of nicotinic acid nicotinamide and epinephrine have partially reversed them.<sup>17</sup> HEF-3 administered into the vein or the peritoneal cavity often causes pulmonary edema or hemorrhage in the cat rabbit and rat.<sup>18</sup> Our attempts to reverse other effects of poisoning have failed with the possible exception of convulsions which are sometimes controlled for example by short acting barbiturates.

The high degree of acute toxicity of these fuels is demonstrated in table 2.<sup>19</sup>

Table 2. LD<sub>50</sub> of boron compounds in experimental animals

Animal species	Route	Purified component of HEF-3 and H <sub>1</sub> Cal-3	HEF-2
Rabbit	Intravenous	6 mg/kg	7 mg/kg
Rat	Intragastric	40 mg/kg	240 mg/kg
Rabbit	Cutaneous	80 mg/kg	1000-3000 mg/kg
Guinea pig	Cutaneous	160 mg/kg	>3000 mg/kg
Rat	4 hour inhalation	23 ppm	12 ppm
Mouse	4 hour inhalation	6 ppm	11 ppm

Insufficient work on which to base good estimates of threshold limit values has been done on the boranes. Observations to date tend to support our previous speculation<sup>9</sup> that these standards are not likely to be set at values higher than 0.05 ppm and may well be set lower.

The military chemicals project was initiated to provide information on acute and chronic toxicity, type of toxic action, and mechanism of toxic action of materials of interest to the Armed Forces. Such information is necessary to the understanding of the nature of toxic injury and thus to prevention of injury, and also to the development of diagnostic and therapeutic procedures. Toxicity studies have been highly useful in guiding the development of engineering equipment and protective equipment. Existing threshold limit values also known as maximum allowable concentrations for most of these military chemicals are based largely or entirely on chronic toxicity studies carried out under this program. These chronic exposures simulate the normal working day, 5 days a week. The unusual requirements of the military services especially on shipboard require possible exposure to contaminants on a continuous basis, that is, for 24 hours a day, 7 days a week. Two toxicologic investigations under such continuous exposure conditions using 4 species of animals have been conducted so far.

It is appropriate to mention the role this project plays in bioastronautics and in submarine medicine. Trace concentrations of some substances, though innocuous for short or intermittent exposures, may become hazardous if exposures last for days rather than hours, as is the case in nuclear powered submarines and as may be true in space vehicles.

Repeated exposures to propellant fuels and oxidizers are hazardous to those engaged in their manufacture, storage, and transport. We must also consider the hazards of toxic end products of combustion, especially when these are nonvolatile. Not only man but plant and animal life in the vicinity of launching areas may be endangered. For example, although boron oxide has a relatively low mammalian toxicity, it is toxic to plants, a fact to be considered when selecting areas where motors using boron fuels are to be operated. We are all aware of the toxic hazards of carbon monoxide, but toxicologic characterization of some of the other combustion products awaits chemical characterization of these end products, and this information is difficult to obtain.

The safe handling of propellant fuels and oxidizers requires alert and informed medical and safety officers. The aim of our program in military chemicals is to perform necessary investigations so that these officials will have the proper information to permit them to prevent

## TOXICITY OF PROPELLANT FUELS AND OXIDIZERS

toxic injury and where preventive measures fail to guide diagnosis and treatment

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# Modification of Standard Plastic Transfusion Pack to Permit Collection of Plasma

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SEVERAL YEARS AGO the United States went out of the plasma collecting business. All stocks of plasma were considered contaminated with the virus of hepatitis and the attack rate after infusion of pooled plasma was 20 to 25 percent. Several synthetics were produced as plasma substitutes but none were free of pharmacologic blemishes. Polyvinylpyrrolidone (PVP) is a plastic which is stored—perhaps permanently—by the reticuloendothelial system no one knows what damage it might cause eventually. Dextran a polymerized carbohydrate causes prolongation of bleeding time in a considerable proportion of normal recipients a propensity which must be regarded as undesirable in a substance intended for the wounded. Plasma itself was the ideal plasma substitute except for the virus and for this reason a continuous effort was maintained to eliminate the virus. It proved to be a tough customer. Temperatures great enough to kill it would coagulate the plasma proteins unless the plasma was mixed with stabilizers and the heat was applied over long periods of time. Serum albumin proved to be virus free but too costly. Various chemicals and various kinds of radiant energy, alone and in combination were tried. Some of them were successful in destroying the virus but they were expensive or caused plasma proteins to become antigenic or to produce febrile or allergic reactions in recipients. It was a discouraging problem. However a relatively simple and satisfactory means of disposing of the hepatitis virus has been found. When plasma is stored in the liquid state at room temperature, the virus dies. It must be stored at least 6 months before the virus is surely dead but at the end of that time the solution

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From W. H. Reed Army Institute of Research, Washington, D. C.

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of human protein is safe and also effective as a plasma volume expander. It seems fairly certain that large scale stockpiling of plasma can, and probably will be resumed. This confronts us with another problem, an economic one: where will we obtain the plasma and how much will it cost?

During World War II, blood for plasma was diverted from the blood collected for transfusion. A proportion of the units of whole blood was sent to processing plants where plasma was separated from red cells, mixed in large pools, bottled, frozen and dried. The cost of collecting and shipping these units of blood was borne by the plasma program so that the price of a unit of plasma included both the processing and the cost of procuring the starting material. The plasma was not separated at the collecting center for fear of contamination, so that there was the additional expense of refrigeration en route to prevent lysis of the red cells. Then, as there was no use for the red cells at the processing plant, they were thrown away, a loss which represented 80 percent of the protein in every unit of blood. (In 500 ml of bank blood, there are 15 grams of plasma protein and 65 grams of hemoglobin.)

It has been pointed out that plasma can be taken from the red cells at the collecting centers, if care to prevent contamination is exercised, so that the red cells can be used for transfusion. Such a program has been followed in several hospitals, but it has usually required a great deal of "education" to induce the hospital staff members to administer the "packed red cells" in place of whole blood. In many cases it is not desirable to do so, this is especially true of surgical procedures where lost blood should be replaced with whole blood rather than packed cells.

The purpose of this communication is to demonstrate that with equipment now available it is possible to obtain starting material for the plasma program without sacrificing any units of whole blood and without converting any units to packed red cells.

## THE SATELLITE POUCH

Our proposal involves the removal of about 70 ml of plasma from every unit of whole blood collected. Blood is routinely collected into an anticoagulant solution (ACD), the volume of which is 70 ml. This solution dilutes the blood, and as a consequence the hemoglobin and hematocrit are depressed. For example, the hematocrit of normal venous blood is about 45 ml per 100 ml. The hematocrit of bank blood is 37 or 38 ml per 100 ml. By removing an amount of plasma equal

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to the volume of anticoagulant solution 40 ml the bank blood is re stored to its original hemoglobin concentration and hematocrit. Such a unit of blood is a practical equivalent of unmodified bank blood. The plasma proteins are in the same concentration as in blood diluted by anticoagulant solution but the hematocrit and hemoglobin concentration have been restored to normal (table 1). The loss from each unit amounts to about 3.5 grams of protein.

Table 1. Hemoglobin blood packed for 10 days and plasma

D	Hb gm/100 ml 100°	Hb as percent of Hb		D	Hb gm/100 ml 100°	Hb as percent of Hb	
		Pack after bleeding— cr	Pack after plasma— 100°—cr			Pack after bleeding— cr	Pack after plasma— 100°—cr
	15.3	90	107		13.3	89	103
	12.3	93	108		15.3	93	101
	14.3	93	99				

Of 30 units stored in this fashion

varied from 5 to 15 ml

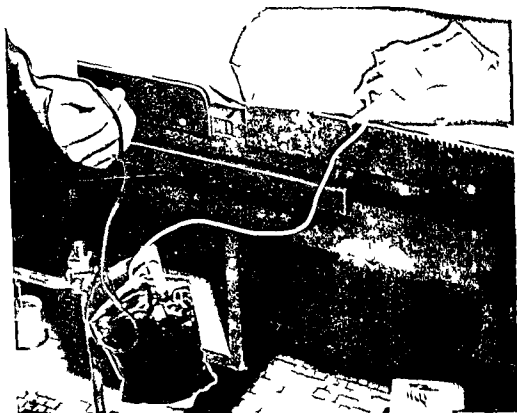
The safe and rapid removal of this increment of plasma is accomplished by a modification of the standard plastic blood transfusion bag (fig. 1). A small satellite pouch is hermetically attached to the bag by a length of plastic tubing. The tubing is closed by means of a steel shot plugged into the end; neither the anticoagulant solution nor the blood can move into the pouch prematurely.

Blood is drawn from the donor in the usual fashion. The unit of blood may then be centrifuged or placed in the blood bank refrigerator for 24 hours until the red cells have partially settled. Two loose throw knots are placed in the tube between the bag and satellite pack and the steel shot is squeezed out of the end of the tube so that it falls into the bag (figs. 2 and 3). The satellite pouch is placed on one side of a laboratory balance which is then balanced and 40 grams of weights are placed on the other side (fig. 3). The bag of blood is gently squeezed so that the separated plasma flows through the tubing into the pouch. When the balance tips the tube is clamped. The throw knots are pulled tight to make a hermetic seal and the tube is cut between them (fig. 4). Transfer of the plasma has been accom

When the blood has been treated, the unit of plasma may be removed from the satellite pouch. If this procedure is followed it would be necessary to stop the flow of the blood in order to be removed from the blood bank with the unit of plasma discarded.

## MODIFIED TRANSFUSION PACK

plished in a completely closed system without any chance of contamination



Figur 1 A donor's blood is bled into a plastic blood transfusion bag. The satellite pouch is attached to the bag by plastic tubing. The donor is bled from the donor.

The plasma in the satellite pouch may be used in a number of ways. The pouch is equipped with an outlet port for attachment of a transfusion set so that the plasma may be administered to patients who need plasma replacement rather than whole blood. It may be frozen immediately and stored to be used when fresh plasma is indicated, as in the treatment of hemophilia. It may be shipped unrefrigerated to plasma processing plants to be used as starting material for the plasma program.

The satellite pouch has been tested on the transfusion service at Walter Reed Army Hospital. Five hundred units were filled, substituting the special bag with satellite pouch for the standard plastic bag. Seventy grams of plasma were removed from each unit the day after collection. The time required to collect the plasma averaged less than 10 minutes per unit. In a few instances the red cell sedimentation was

slow and the bags were centrifuged to clear the plasma. Measurement of the hemoglobin concentration was done on the first 30 bags. Three measurements were made (table 1) (1) the donor's venous blood



Fig. 2 A tube is inserted into the vein. The tube is pushed into the vein. The blood is drawn out of the tube and filled into the bag of blood.

(2) the blood in the bag immediately after collection and (3) the blood in the bag after the 10 gram increment of plasma had been transferred to the satellite pouch. The measurements confirmed the obvious—the blood was diluted by the 70 ml of ACD solution in the bag so that the hemoglobin concentration was lower in the bag than it was in the donor's blood. Removing the increment of plasma restored the hemoglobin to normal in the bag.

The 500 units of blood were used by the medical and surgical services of Walter Reed Army Hospital without complaints and with only one comment. One of the officers in thoracic surgery remarked that patients who received large transfusions of this blood came into



## MODIFIED TRANSFUSION PACK

the postoperative period with hematocrits a little higher than usual, around 48 ml per 100 ml instead of 42 ml per 100 ml

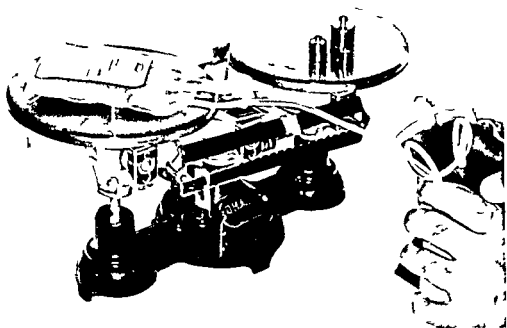


Figure 3 The satellite pouch is placed on the pan on the laboratory balance which is adjusted to counterbalance the weight of the pouch. On the opposite pan 10 grams of weights are placed and plasma is squeezed from the bag into the pouch until the balance tips. Note that there are two loose throw knots in the connecting tube. When the transfer of plasma has been completed these knots are pulled tight to form a hermetic seal in the tube.

The trial was a success. It demonstrated that the units of blood were not substantially altered by removal of a small amount of plasma. The collection of plasma was carried out without placing any great demand upon the blood bank personnel. The units of blood were accepted without complaint by physicians and surgeons alike. Most important from the point of view of those interested in the plasma program, 35,000 ml of plasma was obtained without sacrificing a single unit of blood.

## DISCUSSION

During the former plasma program the manufacture of 1 unit of dried plasma required 2 units of whole blood and cost about \$27. About \$10 of this amount represented the cost of collecting and ship-

ping the 2 units of blood. Manufacture of 1 unit of serum albumin required 4 to 5 units of blood and cost about \$4. Of this sum about \$35 represented the cost of the blood. It is obvious that the greater part of the cost of plasma or serum albumin represents the cost of collecting and shipping whole blood is the starting material. Plasma collected in this fashion cost about 4 cents per ml. Plasma collected in satellite pouches would probably cost about 1 cent per ml if extensive collections were instituted.

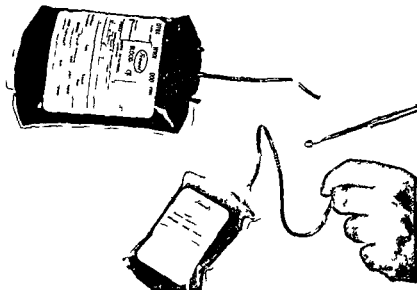


Fig. 4. The tube put between the knut. The tube of plasma has been replaced and completely filled with blood. The tube of plasma has been replaced and completely filled with blood.

Usually it is difficult to obtain donations of blood in considerable numbers. It has been found that advertising and other kinds of social pressures are continually needed to counteract the public's apathy regarding requirements of the national blood program. Use of the satellite pouch will prevent a further complication of the problem. Otherwise to provide for the plasma program the national blood program would have to be expanded or a competitive blood procurement program would have to be established. In either case the cost and difficulty of procuring blood would be increased. With the satellite pouch the blood program and the plasma program will be entirely compatible. There will be no requirement for expansion and little if any increase in cost.

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### SUMMARY

The plastic transfusion pack is a standard item of medical supply for the Armed Forces and has gained wide acceptance in civilian transfusion services. It has proved to be superior to the glass bottle as a means for collection, storage and administration of blood. A modification of the standard plastic pack has been developed which permits each unit of blood to be fixed 70 ml of plasma in amount equivalent to the volume of the anticoagulant solution which is added to the blood during collection.

A small satellite pack is fused to the parent bag by means of a length of plastic tubing. The blood is drawn into the parent pack in the usual fashion and is placed in the refrigerator. When the cells and plasma become separated, the plastic tube is opened and the parent bag squeezed so that 70 ml of plasma run into the satellite. The tube is then clamped and cut. The loss of plasma restores the blood to its original hematocrit so that *it can be utilized as whole blood* rather than as packed red cells. This point is readily accepted by those who use the blood. By fixing each unit of blood a small amount, the procedure provides material for a plasma program without sacrificing any red cells or units of whole blood. The sterility of the blood and the plasma is not endangered because the transfer of plasma is accomplished in a completely closed system.

This method of collecting starting material for a natural plasma program has been given an extensive trial which demonstrated its practicality. If used on a broad scale it would materially reduce the cost of the plasma program.

**ACKNOWLEDGMENT** The special plasma bags with satellite pouches were supplied for testing by Kenwall Laboratories, Framingham, Mass.

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# Lupus Erythematosus Cells in Scleroderma

## Report of a Case and Analysis of the Phenomenon

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LIEUTENANT COMMANDER JOSEPH T HORGAN MC USA

TRANSITIONAL SYMPTOMATOLOGY within the group of collagen vascular diseases may cause confusion and delay in precise diagnosis. The following report concerns a young woman with undoubted scleroderma who manifested positive I E (lupus erythematosus) cell tests on two occasions. Only a few years ago discussion of her case invariably centered on the specificity of the L E cell test. Today particularly in view of recent experimental studies (vide infra) provocative questions arise regarding basic interrelationships in the group of collagen diseases.

### CASE REPORT

The patient (B\H 107) a 17-year-old white woman was admitted in August 1946 to this hospital for study and treatment of a disease thought to be typical of scleroderma. She had been transferred from the US Naval Hospital at Key West, Florida.

Her illness had begun in January 1940 at which time she noted the presence of a discrete, pale white and waxy thickening of the skin, just above the medial malleolus of the right ankle. It was little more than 1 cm in diameter when first noted and seral physicians who examined the lesion failed to determine its nature. She eventually referred to dermatologist who made a clinical diagnosis of scleroderma and a therapeutic trial of Bi-tim-te (odium bismuth triglycolate) was begun. This medication was used in varying dosage over the next year, but proved ineffective. The rigidity continued to increase and by the middle of 1944, both legs showed rather symmetrically placed sclerodermatous plaques, which extended almost halfway to the knee. The dorsa of the feet were uninvolvement.

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## LE CELLS IN SCLERODERMA

In June 1962 biopsy specimens were sent to two university centers for independent histopathologic interpretation. Pathologists at both centers reported that the tissue picture was compatible with the clinical diagnosis of scleroderma.

*Pathologist A:* We noted subdermal fibrosis and hyalinization with partial destruction of skin appendages. An inflammatory component was noted and also foci of calcification. It was our feeling that the picture was compatible with a diagnosis of scleroderma.

*Pathologist B:* The overlying epidermis is pigmented and somewhat atrophic. The dermis is thickened and composed of dense collagenous tissue. This surrounds and compresses scant dermal adnexae. Small sweat glands are incorporated in the sclerotic dermis. In addition there is a chronic inflammatory reaction predominantly perivascular and lymphocytic. The walls of the vessels are thickened. It is felt that the histologic appearance of this skin segment is consistent with a diagnosis of scleroderma. It is not possible on histologic grounds alone to distinguish the clinical circumscribed and generalized varieties.

Following establishment of a tissue diagnosis the patient traveled widely throughout the country seeking the aid of many physicians but rarely staying with any one for an appreciable length of time. There were several short periods of hospitalization and he was repeatedly presented to medical students as a classic case of scleroderma. In October 1962 cortisone therapy was begun, and continued on an interrupted dosage schedule for 8 months, without noticeable improvement. Artane (trihexyphenidyl) hydrochloride was added to the cortisone regimen for an additional 4 months again without apparent effect. The disease progressed inexorably; leg involvement extended to the knees and the arms became involved from the wrists to the elbows. Although there was very marked stiffness of the joints Raynaud's phenomenon was not noted. Subsequently the disease spread over the upper arms and legs and the hands became involved. Patches of morphea appeared over the pelvic girdle and trunk. In July 1964 the dorsum of the left foot was scratched and an indolent ulcer developed which required 3 years to heal. During the worst period extensor tendons were exposed over the entire dorsum of the foot. The use of crutches and consequent flexion of the left knee resulted in ankylosis of that joint.

During the period from May to December 1965 the patient was treated with relaxin. She noted no improvement. However the skin lesions which had been dead white in color became definitely bronzed at this time.

In January 1966 prednisone therapy was begun and in addition the patient received six injections of ethylenediaminetetraacetic acid. Her condition seemed unchanged.

At the time of admission to this hospital a pertinent feature of the physical examination included atrophy of the skin of all extremities the process being more marked distal to the elbows and knee but present in lesser degree proximally. The skin was distinctly brown in color, firmly adherent to the tissues below and hard and waxy to the touch. There were flexion contractures of the fingers of both hands and of the left knee. Movement of the left ankle was restricted and the patient was ambulatory only with crutches. Large areas of depigmented and atrophic epithelium were present over the back and there were distinct sclerodermatous plaques over the pelvic girdle. There were many trophic ulcers over the dorsum of the left foot and ankle. The patient was 3 months pregnant. (Figs 1-4)

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Female laboratory examination performed during the period of hospitalization. Repeat total bilirubin 11.0 mg/dl, total protein 6.8 g/dl, albumin 4.0 g/dl, globulin 2.8 g/dl, A/G ratio 1.4, hemoglobin 11.5 g/dl, hematocrit 36%, red blood cells 3.8 million/mm<sup>3</sup>, white blood cells 19,000/mm<sup>3</sup>, lymphocytes 27%, monocytes 47%, eosinophils 1%, neutrophils 15%. Hemoglobin 11.5 g/dl, hematocrit 36%, red blood cells 3.8 million/mm<sup>3</sup>, white blood cells 19,000/mm<sup>3</sup>, lymphocytes 27%, monocytes 47%, eosinophils 1%, neutrophils 15%.

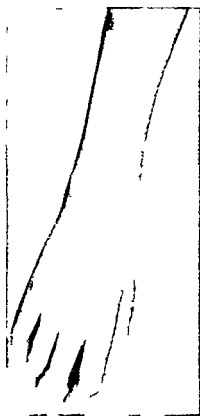


Figure 1 Muscular atrophy and pigmentation of right hand and forearm and flexion contractures of fingers. Illustrated rat on radial pectoral secondary to the proliferation of connective tissue and to the white pigmentation of the skin of the dorsal aspect of the hand.

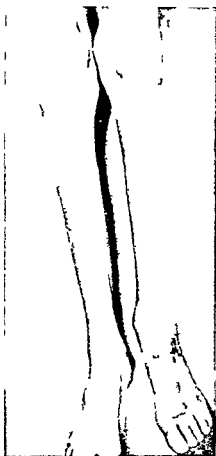


Figure 2 Extrem muscular atrophy of the right arm and hand. The patient is shown in a position of extreme flexion of the right arm and hand. The patient is shown in a position of extreme flexion of the right arm and hand.

hematocrit 36% (normal 37-47%), hemoglobin 11.5 g/dl (normal 12-16 g/dl), red blood cells 3.8 million/mm<sup>3</sup> (normal 4.2-5.4 million/mm<sup>3</sup>), white blood cells 19,000/mm<sup>3</sup> (normal 4,000-10,000/mm<sup>3</sup>), lymphocytes 27% (normal 20-40%), monocytes 47% (normal 2-10%), eosinophils 1% (normal 1-6%), neutrophils 15% (normal 40-60%).

## LE. CELLS IN SCLERODERMA

tion. The serologic test for syphilis was negative. A direct Coombs test was negative. An electrophoretic pattern of serum proteins, obtained while the patient was on steroid therapy was within normal limits. Total protein was



Figure 3 Areas of depigmented and atrophic epidermis of back, and discrete plaques of scleroderma over the pelvic girdle.

3.8 grams per 100 ml of blood, with 4.0 grams of albumin, and 1.4 grams of globulin. The direct van den Bergh test showed 0.04 mg per 100 ml of bilirubin; the indirect 0.14 mg per 100 ml. Cephalin flocculation was negative at 15 hours. Thymol turbidity was 1 unit; alkaline phosphatase 14 Bodankey units. Prothrombin time and control were both 12 seconds. Total cholesterol was 180 mg per 100 ml with 0.7 esters. Blood urea nitrogen was 1.2 mg per 100 ml; fasting blood sugar 80 mg per 100 ml; calcium 9.7 mg per 100 ml; phosphate 2.8 mg per 100 ml. The differential titer of the hemagglutination test for rheumatoid

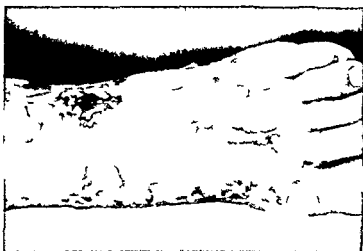


Fig. 4 Trophic and utilization of the food



Figure An LE II from 1 of the 2 post prep rats (x 1000)



## L.E. CELLS IN SCLERODERMA

arthritis was 1+. Lupus erythematosus cell preparations prepared by the method of Snapper and Nathan,<sup>1</sup> were positive on two occasions (fig. 5).

Roentgenograms of the chest and esophagus revealed no abnormalities. An upper gastrointestinal series was normal, as was the follow up study of the small bowel. Intravenous pyelograms showed a normal upper urinary tract. Roentgenograms of the ankle and left knee showed demineralization of all visualized bones and diminution of the soft tissue shadows overlying the osseous structures. There was narrowing of the interphalangeal joint spaces in both hands.



Figure 6 Skin biopsy showing loss of rete pegs atrophy of dermal appendages and heavy collagenization of the dermis (x 10)

The electrocardiogram was normal. Studies of pulmonary function indicated that the maximal breathing capacity was in the low normal range.

A repeat biopsy was not performed because the last site of excision had required 10 months for healing making the patient reluctant to grant permission. However both the previous biopsy specimens were reviewed by pathologists at this hospital, and they concurred in the opinion that the histopathologic picture was compatible with the clinical diagnosis of scleroderma (fig. 6). The L.E. cell preparations have been presented without history to several disinterested pathologists and hematologists and have been considered positive by all who have seen them.

## COMMENT

Scleroderma has become such a well recognized clinical entity that individual case reports hardly warrant publication unless they present some features of unusual interest. The case presented is of particular interest in several respects. The observation of a positive LE phenomenon in this disease is rare; the authors know of only two detailed reports of similar instances and brief references to two others. It has been possible to document 69 individual instances in which the LE phenomenon has been absent in patients with scleroderma<sup>4</sup> and indeed there may be more. Corroborative statements of some authors were excluded when it was not clear whether they were writing from personal experience.

The rarity of the reported observation, however, is of minor importance and now having been mentioned, can be dismissed without further elaboration. Of much more compelling interest are the questions that arise regarding the specificity of the LE phenomenon and the interrelationship of the several diseases in the so called collagen vascular group.

Ever since the discovery by Hargraves, Richmond and Morton<sup>1</sup> of the LE cell in the marrow of patients suffering from systemic lupus erythematosus, the demonstration of such cells has been considered diagnostically specific. There have been several large scale surveys attesting to the reliability of the LE test and many physicians attribute a degree of specificity to the phenomenon that they would deny to other clinical laboratory procedures. Thus in a recent survey among 90 hematologists, all of whom had a special interest in the LE phenomenon, 15 found the test to be 90 to 95 percent reliable. Conley found the LE test to be more reliable than the Wasserman test and felt that the reported lack of specificity was due to failure to adhere to the rigid criteria in identifying LE cells. Similarly Dubois has stated, "false positive tests do not occur with the possible exception of the hydralazine syndrome, which may be the chemical induction of systemic lupus erythematosus." Harvey and associates were unable to demonstrate the LE phenomenon in 663 instances when testing persons with diseases other than systemic lupus erythematosus. The consensus would appear to be summed up in the statement of Weiss and Swift, "the presence of clumping rosettes and the typical LE cell may in the present state of our knowledge, be taken as conclusive evidence of systemic lupus erythematosus."

Nevertheless, the LE phenomenon is sometimes positive when the diagnosis of lupus erythematosus is clinically doubtful and there

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is a growing list of disease entities other than systemic lupus erythematosus in which typical LE cells have been reported. This list includes multiple myeloma,<sup>7</sup> pernicious anemia,<sup>8</sup> dermatitis herpetiformis,<sup>10</sup> leukemia,<sup>7</sup> monilia,<sup>11</sup> Senechal's syndrome,<sup>1</sup> glomerulonephritis,<sup>22</sup> during cortisone withdrawal,<sup>23</sup> penicillin hypersensitivity,<sup>4, 23</sup> hydralazine toxicity,<sup>9</sup> military tuberculosis,<sup>3</sup> chronic viral hepatitis,<sup>21</sup> post-necrotic cirrhosis,<sup>23</sup> discoid lupus erythematosus,<sup>7</sup> serum sickness following tetanus antitoxin,<sup>4</sup> periarteritis-nodosa,<sup>23</sup> dermatomyositis, thrombohemolytic thrombocytopenic purpura,<sup>24</sup> classic rheumatoid arthritis, and during butazolidin therapy.<sup>25</sup> Hasegawa<sup>3</sup> has indicated that the LE phenomenon can be imitated by materials of fungal origin. Inderbitzen<sup>26</sup> has produced structures resembling LE cells with polyvinyl alcohol polysulfonic acid ester, and normal gamma globulin. In essence objections to all of these reports fall into three categories: (1) errors in original diagnosis, (2) nonrecognition of coexistent systemic lupus erythematosus, and (3) failure to adhere to rigid criteria in the identification of the LE cell.

It is possible of course to offer alternative viewpoints to the objections raised. There can be no doubt that in some of the reported cases the diagnosis of systemic lupus erythematosus was mislaid, and the observation of a positive LE phenomenon was in fact a reflection of the unrecognized disease. Indeed systemic lupus erythematosus may be so vague in its clinical expression that a prolonged period of observation is necessary before diagnostic features are definitely manifest. It would appear unjustified, however, to dismiss the clinical observations of men with prolonged experience contrary laboratory data notwithstanding and assume that all previous reports of positive LE phenomena in diseases other than systemic lupus erythematosus were questionable. Several of the case reports, particularly those in which necropsy was performed, are convincingly documented. The suggestion of failure to adhere to rigid criteria in the identification of LE cells is not tenable today since knowledge of pseudo LE phenomena, nucleophagocytosis, giant cell formation, and leukoagglutination is commonplace.

Interrelationships within the collagen vascular group of diseases have long been speculative. Kampmeier<sup>1</sup> has suggested that they represent expressions of a fundamental tissue process. Beigelman, Goldner and Bayles<sup>22</sup> place systemic lupus erythematosus and scleroderma in the same pathogenetic group, the former deriving from a severe rapid connective tissue reaction, with edema and necrosis predominating and the latter representing a slow, generalized mesenchymal response, with fibrosis and sclerosis predominant.

There is increasingly more persuasive evidence indicating that certain disease states may be manifestations of autoimmunization although precise mechanisms are as yet obscure. Within this group might be mentioned certain of the hemolytic anemias idiopathic thrombocytopenic purpura Schonlein Henoch purpura systemic lupus erythematosus thyroiditis Sedormid and quinidine thrombocytopenia the hydralazine syndrome and perhaps those instances of penicillin hypersensitivity associated with a positive LE phenomenon.

Strong support for the view that the LE phenomenon may represent autoimmunization against leukocytes has recently been advanced. Mellors, Ortega and Holman<sup>10</sup> have observed that the nuclei of leukocytes undergoing transformation to form lupus erythematosus cells develop fluorescence when stained with a specific antibody for human gamma globulin and that such fluorescence can be inhibited by prior absorption of the fluorescent antibody stain with human gamma globulin. Similarly Bardawil and co-workers<sup>11</sup> have observed a specific reaction between cellular nuclei and the gamma globulin fraction of the sera of patients with systemic lupus erythematosus scleroderma dermatomyositis and certain cases of rheumatoid arthritis presenting positive LE cell reactions. They feel that the affinity between serum gamma globulin and desoxyribonucleic acid (DNA) protein may reflect a natural phenomenon basic to these disease entities and they voice the reasonable suspicion that all may be manifestations of a common disease process initiated by sensitization with either intrinsic or extrinsic nucleoprotein.

In the case that we have presented we find ourselves unable to accept a clinical diagnosis of systemic lupus erythematosus. We have had the opportunity of following the patient through several periods of hospitalization and on an outpatient basis ever since her initial admission. We have seen her develop striking facial scleroderma. Although skin changes resembling scleroderma can be found in patients with systemic lupus erythematosus they are not nearly so pronounced as those presented by this patient. The course of her illness since its beginning 9 years ago the development of the typical dermal lesions of scleroderma and their histopathologic confirmation cast doubt on any diagnosis other than scleroderma. The LE cell preparations positive on two occasions may indeed reflect a basic and fundamental relationship between systemic lupus erythematosus and scleroderma but they do not in themselves serve to establish a clinical diagnosis.

## SUMMARY

The case report of a young woman with scleroderma, who manifested a positive LE cell phenomenon on two occasions, is presented. It is suggested that the observation of LE cells may reflect a fundamental relationship between scleroderma and systemic lupus erythematosus, but that such cells do not serve for the establishment of a diagnosis that is clinically doubtful.

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## THE PHYSICIAN AND THE MORTICIAN

Physicians do not like the odor of the tombstone around their work and many doctors shy away from the persistent social and professional contacts with funeral directors. This however is unrealistic reasoning. Funeral directors as individuals are no doubt jolly fellows who make very good social companions. More important than that however the funeral director can be a friend in need to the physician not only at the time of a death among his patients but also as an ally in some of the doctor's legal administrative and legislative battles.

In the antiquity of their calling the morticians need not take a back seat to anybody. Embalmers had achieved professional status in Europe and Asia at a time when many branches of medicine were still at the stage of a skilled craft. Morticians have been the victims of an understandable prejudice against them because no one likes to be reminded of death. For this reason they had been denied the professional recognition which has been awarded to dietitians, nurses, pharmacists and psychologists. Yet when the chips are down it must be conceded that the professional mortician is indeed a practitioner of a very ancient and skilled science. Mark Twain used to say that the sign of a good life was when even the undertaker was sorry that the man died. As usual Mark Twain was a wise man — Funeral Director Friend in Need (editorial) *The Journal of the Medical Society of New Jersey* August 1959

# Relation Between Certain Preservice Factors and Psychoneurosis During Military Duty

MERRILL ROFF PH D

THIS IS THE THIRD REPORT of a project on the prediction of adjustment in relation to military service from preservice information recorded during childhood and adolescence in guidance clinic case histories. The basic aim of this work is to determine what types of preservice maladjustments and personality problems and associated background factors as described when they were occurring rather than retrospectively are significantly related to and predictive of maladjustments of various kinds in relation to military service.

All the male individuals from the two main guidance clinics in Minneapolis and St. Paul have been followed in terms of their military service records in the Selective Service system, in national records depots, and at the Veterans Administration. An introductory report describing these and other samples in some detail and indicating the types of criterion data available and the frequencies falling in various criterion categories appeared as the first report in this series. This also included a preliminary prediction study, global both as to method of prediction and as to outcome (satisfactory, unsatisfactory) which indicated that there is a substantial relationship between the preservice case history information and subsequent adult adjustment.

Once it had been found that global predictions of gross outcome could be made at a level high enough to be interesting, further work was directed toward the more analytic prediction of more specifically defined outcomes, beginning with the prediction of in-service psychoneurotic reactions. In order to avoid the risk of losing the pre-

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## PRESERVICE FACTORS AND PSYCHONEUROSIS

dictability found with the global approach, subsequent procedures were aimed at moving gradually downward from global appraisal, rather than going at once to a completely analytic approach. It was found that youngsters who antagonized and were disliked by their associates to an unusual degree (as reported by persons, particularly in the school systems, who had had an opportunity to observe their behavior in relation to their peer group) were those who had psychoneurotic difficulties while in military service some years later. The present report describes a successful replication of this work on a new sample. It also presents additional information concerning the relation between psychiatric comments during pre-service clinic treatment and subsequent outcome in service.

### METHODS AND MATERIAL

The work described in this report is a direct replication, on a second sample, of the predictive procedures described in the preceding report.<sup>1</sup> The sample described in that report contained 110 persons, all of whom had been dealt with the child guidance clinic of the Minneapolis schools during their grade or high school year, and who were in service during World War II. Half of the 110 subjects, the psychoneurotic group, had been medically diagnosed as having difficulty of a psychoneurotic kind (anxiety state or reaction, neurasthenia, conversion hysteria or conversion reaction, obsessive compulsive reaction, reactive depression and mixed or unspecified) leading either to a medical discharge or in a small minority of cases, to hospitalization followed by a return to duty. The other half, which served as a control group, was a 'good' group selected as having reached and kept a grade of sergeant or higher without history of disciplinary or mental health trouble at any point following entrance into service. The two groups were matched in pre-service intelligence level, from information contained in their original case histories.

The sample used in the present study contains 98 cases: half psychoneurotic in service and half control as defined above, consisting of St. Paul cases and of Minneapolis cases more recent than those used in the preceding report. The psychoneurotic and control cases were selected in the same manner as before and were similarly matched in pre-service intelligence level.

### PROCEDURE

The procedure developed earlier concerning the selection of items of information in the case histories was followed.

of peer group adjustment and relationships in the period covered by the history and of applying a set of rules for evaluating these. These rules for readers (who were first year graduate students) evaluating the abstracted items related to three headings were

**Chronology** The date was carefully retained for all abstracted information. In case of contradiction between earlier and later information other things being equal greater weight was to be given to the later information.

**Informants** It was found desirable to accompany all abstracted items by the category of the person giving the information. A priority list of informants was developed with instructions to the readers to examine first the data from informants with highest priority and to keep working down this list as long as and only as long as it was necessary to reach a decision.

### Priority List of Informants

1. Person with the family background and opportunity to observe him in a peer group situation—this person is of school age, to generalize, except he qualified directly.

2. Visiting teacher, classmate, or marriage information person so in category with specific question, clear and definite formal diagnosis of the child's behavior, high level of social adjustment.

3. Family member, especially father, mother, or high school graduate.

4. Student body psychiatrist, psychiatrist, or statement by psychiatrist, except as noted by the psychiatrist by psychological background, mental diagnosis, maladjustment.

**Content** A guide list for information to be evaluated as positive, neutral, or negative in appraising peer group adjustment was developed. Positive items included such things as all signs of liking by the general peer group and not a behavior problem in class or on the playground. Neutral items included such things as shortage of friends without specific indications of being disliked, indifferent to other youngsters or they are indifferent to him, and disciplinary problem in or around school without adverse reaction from other youngsters. Negative items included such things as all signs of active dislike by the general peer group, do not count single fights or feud with a specific youngster but count enough quarrels to get the boy labeled as quarrelsome and disciplinary problem in or around school with consequent adverse reaction from other youngsters.

Working with these three sets of guide rules concerning chronology, informant, and content readers appraised the peer group status indicated by the abstracts from the histories. Judgments of good or

# PRESERVICE FACTORS AND PSYCHONEUROSIS

'poor' were to be made only if the reader felt reasonably certain of a judgment. If the information seemed incomplete, unclear, or inconsistent a response of undecided was to be made. When the results of these appraisals which were completely "blind" with respect to outcome in service, were compared with status in relation to service, table 1 results<sup>2</sup>

**Table 1** *Evaluations of pre service status in relation to outcome in service early sample*

Outcome	Appraisal		
	Good	Undecided neutral	Poor
Good	27	21	7
Psychoneurotic	6	21	23

$n=2597$

$P < .001$

When the same procedure was applied to the second sample of 98 cases, the results shown in table 2 were obtained

**Table 2** *Evaluations of pre service status in relation to outcome in service late sample*

Outcome	Appraisal		
	Good	Undecided neutral	Poor
Good	27	11	11
Psychoneurotic	7	8	34

$n=2399$

$P < .001$

It may be seen by comparing the two tables that the ratio of successful predictions for the 'good' and 'poor' appraisals are similar. In each case the number of cases predicted "poor" who were later psychoneurotic is at least three times the number with "good" outcome. Cross validation can be considered satisfactory.

## PREDICTIVE SIGNIFICANCE OF EARLIER PSYCHIATRIC EVALUATIONS

The preceding report also presented a comparison of psychiatric comments in the case histories with outcome in service. These comments were based not only on all that was known about the boy by the clinic at the time of first interview but also in many cases on a substantial number of psychiatric interviews extending over a period of years. In many of the cases considered seriously deviant by the psychiatrist some departure from normality was also clearly apparent to the peer group and teachers.

Analysis of these comments which are present in each history indicates that there are three kinds of comments which are ineffective in differentiating between cases in terms of later adjustment. One type of these may be called contingent predictions in them a hope is expressed that if some presently adverse factors in the situation change somewhat, an improvement might be expected. For example, "If he could be separated from his present bad home situation he might get along all right."

A second kind of unpredictable comment is a statement of what the boy was considered to be adjusting to—sometimes in terms of a psychodynamic interpretation sometimes in a recapitulation of factors in the home or elsewhere which seemed contributory to the problem. For example, "He evidently has a feeling of inferiority brought about largely by his mother's overindulgence and failure to encourage the development of self confidence and independence. His problems have probably developed in part as defense reactions."

His temper outbursts are reactions to frustrations which probably have been developed in the home.

A third type of comment unpredictable in relation to later psychoneurosis is the relative comment. One form this may take is a statement that the individual is improved without indicating that he is in good condition. Other statements that may be similarly classified are that he is making as good an adjustment as could be expected, he does not give such an impression of disturbance as he did in the previous interview, there are no really outstanding conflicts.

When statements of these three types are disregarded there remain the definitely diagnostic judgments by the psychiatrist which appear about as effectively predictive in the present sample as they did in the earlier one. These are found in only a minority of cases but when they occur they are worthy of notice. Table 3 gives a case by case summary of the 22 of the present 98 cases in which definite comments, positive or negative were made.

# PRESERVICE FACTORS AND PSYCHONEUROSIS

Table 3 Early psych atr c comments and subsequent service experience

Case No	Psychiatric comment	Experience in service
	L f or M e t m m f u r h f o r M o u t c o m	
1	<p>II 1 ea the impressi n f b ing p p ych ti</p> <p>Th d p e s i o n o f f w m t h s a g o f o l l w d</p> <p>by his p e s e n t h y p m a n i b e h a f o r s g g t</p> <p>th p a s s i b i l i t y f m a n i - d e p e s s v p s y c h o</p> <p>s i A y t t h h a s b e e n n o d e c e o f</p> <p>h a l l m t i n s d l u s i o s I I f s e x u a l l y</p> <p>f i t d b c a s e h h a s b n g h t a f t</p> <p>by b y s f s e l p u r p o s e s T h e a r t w</p> <p>p b l i n s t o b d a l t w i t h - t h t f m n t a l</p> <p>i l l n s s a n d t h t f d l i n q u e n c y</p>	<p>I service 14 m th cook n d ction</p> <p>(P/c to P t) m d i c a l d i s c h a r g p s y c h o -</p> <p>n e u r o s i s s e e e m a n i f t d b y b e s s i e -</p> <p>c o m p u l i e r a c t i o n a n d e p i s o d s f a c u t e</p> <p>a n x i t y w i t h d p s s i o n m o t i n a l i n s t a</p> <p>b i l i t y l a t n t h m s e x u a l t e n d i m m a t u</p> <p>t y a n d p t h l g e l y i n g</p>
2	<p>Ag 13 H is an unsta ble and v y l i k e l y n</p> <p>t i b y w i t h a n f i t s a n d p h b i a s w h i c h</p> <p>h m y d i s s a i n d t a i l l a t n</p> <p>Ag 15 His plan ar soun ten b l t h t h e l e s</p> <p>th i m p s s i n f h i n g l i t t l l o s e t c h</p> <p>w i t h a l i t y A d i a g n o s i s f p p s y c h s i c a n</p> <p>o t b m d w i t h u r e n e s s H e d o e s n t p</p> <p>p e a r t h e b c o m a n y m o d a n c e d i n</p> <p>p j b o t e b h f o i n c e h a s f i r t s e</p> <p>Ag 16 H s t u l l l e a s t h i m p s s n f b e i n g</p> <p>p p y c h t e I n l w f t h e f t i t h h a s</p> <p>b e t h i s w j f s o l o n g t i s m l i k e l y t h t</p> <p>h i s j u s t a n u n u s a l l y b a r r p s o n w t h</p> <p>b m a l h a t t a t</p>	<p>In ser ce 9 mo ths P t b a s i s o l d i e r</p> <p>M d c a l d i c h a r g p y c h o n e u r o s i s m i e d</p> <p>h a s g r a n d i o s e i d c o n c r n i n g h i s b i l i t i s</p> <p>a n d m a i n t a i n s p s e d o i n t e l l e c t a l t t i t d</p> <p>h w e d m a r k d f f i m i n a r y i n m a n n e r i s m s</p> <p>s p e e c h a n d b e h</p>
3	<p>It is quit b l s t h t h h a s o t i m p d</p> <p>g r t d a l a n d f t h e s a m c o c e r n e d b y</p> <p>H e c o t i n t l t h i m p e s s n o f b e i n g</p> <p>u r t l</p>	<p>In servi 14 month C d t m d s h i p m a n</p> <p>M e d c a l d i s c h a r g p s y h o n e u r o s i s n u</p> <p>a s t h n u a</p>
4	<p>H e g s t h i m p s s n f b e i n g n e u r t b y</p> <p>I I f i t c r y s j f h i m s e l f a n d i f t h i m</p> <p>p e s s n f b i n g q t u n t b l</p>	<p>In 42 month o s e a s e r v i c e</p> <p>C p l i r p l a n e a n d e n g i n m e c h a n I I s</p> <p>p t a l i z e d 6 w k f n u r a s t h e n i a a n d e</p> <p>t u r n d t d u t y L t h o s p i t a l i z e d f 3</p> <p>m o n t h p y c h o n u r o s i s a n x i t y a n d e</p> <p>t u r n d t d t y</p>
5	<p>H is an unus l y t n s e t l s s t a l k t i e</p> <p>b i b i t i l s t i d l o e t f i l l d w i t h a n x i</p> <p>e t i H l f t h i m p r e s s i n f b i n g q u i t e</p> <p>d i s t i n t l y n u r t l</p>	<p>In service 31 m n t h n o r s a s r v i c e</p> <p>T / s u r g i c a l t c h n i c i a n M d i c a l d i s -</p> <p>c h a r g f p s y c h n u r o s i s s e r e m a n i</p> <p>f t d b y s e r a n x i t y a n d n r v s n a s</p>
6	<p>I f e i s n o r t l d l i n q n t I I l e f t t h i m</p> <p>p s s i o n f b i n g q i t p a n l k y P b p t t</p> <p>b e c a u s e f h i s m a r k d m t i n a l d i s t u r b</p> <p>a n c e t h t h p p e a r d t b p s s i b l y p p s y</p> <p>c h t i e</p>	<p>In service 3 m t h s B c a m u n f i t f o r d t y</p> <p>f t e r l y 6 d j f s e i c e M d i c a l d i s -</p> <p>c h a r g f l l i n g b p i t l i z t i o n f p y</p> <p>c h u r i s m i x d p y h a s t h e n i a a n d</p> <p>a n x i t y c o n s t a n t p o c c u p t i o n w i t h f a r</p> <p>i d t h a n d s a f e t y f r e l a t i i r r i t a b i l i t y</p> <p>a n d i n s o m n i a p c l i n i c a l d e m n t i a</p> <p>p</p>
7	<p>Ag 10 By d g r h i s a d m i t t i n g p l a s u r e</p> <p>h g t t h r u g h e h b i t i n i s m a n d b i n g u s e d</p> <p>p a s s i l y a s s e b j t b y t h b o y s</p> <p>Ag 12 It is q t t b i u s t h t h i s a g a i n</p> <p>a c u t e l y u r o t i</p> <p>Ag 14 H c o t i n t s h w h i s n u r o t i p t</p> <p>t e r n f b e h i</p>	<p>In r v i c e 5 m n t h s d t y s o l d i e r M d i c a l</p> <p>d i s c h a r g t i n l i n o f d u t y p s y c h o -</p> <p>n e u r o s i s o t s u l t i n g f r o m c o m b t m a n</p> <p>i f s t e d b y a n x i t y a s t i n c h r o n i c b a s e d</p> <p>l a t e t h m o s e x u a l i t y a n d b y s e e r e r v</p> <p>o u s t e n s i t r m u l u s n s s a n d o c c a</p> <p>l o n l a n x i t y a t t a c k s</p>

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Table 3 Early psychiatric comments and subsequent performance—Continued

Case No.	Psychiatric comment	Experience in service
	<i>Unfavorable comment with favorable outcome</i>	
8	While he has made some progress his problems are so set and fixed so regarding the guilt isn't a point where he can control himself and his feeling. At times has been accessible to real psychotherapy.	In service 16 months, increased by German. Hospitalized in times for various physical difficulties and for psychoneurosis, hysteria. Medical discharge for psychoneurosis anxiety.
9	While he has enough information to indicate that he is an extremely homosexual. There is apparently no real feeling of guilt in connection with his homosexuality. I am of the impression that he is quite adjusted in his homosexuality and does not wish help.	In service 34 months, Pacific theater 42 months. Twice reduced to Pvt. highest grade reached S/Sgt. clerk typist AWOL 9 and 11 days. O summary court martial for AWOL. Diagnosis at discharge (1) Sexual delinquency (2) Homosexuality (3) Psychoneurosis chronic, severe manifested by severe anxiety and depression in emotional instability suicidal attempts. Incompetency severe.
	The prognosis in this case appears to be very poor because of his instability and his marked hostility toward his father. It is unlikely that in the future he will show tolerance. There is little that can be done about this but we must perhaps get him away from his present environment.	In service 10 months prior to World War II. Bad conduct discharge for desertion in service 3 months 1943 with medical discharge psychoneurosis.
11	It would seem that we are dealing with an emotionally unstable boy whose instability has been increased by trauma to the central nervous system. His behavior warrants the provisional diagnosis of traumatic neurosis. The possibility of developing psychosis must be considered.	In service 36 months increased service. Placed by soldier one reduction (Pfc. to Pvt.) 1 day AWOL. Medical discharge psychoneurosis, manifested by nervousness emotional instability complaints of pain in back and difficulty in bearing and seeing without adequate organic cause and with inability to perform duties.
	<i>Favorable comment with favorable outcome</i>	
12	He is deeply neurotic boy with great deal of aggression.	In service 35 months 14 months in Europe. Sgt. administrative specialist excellent character and efficiency rating.
13	Age 10. He is neurotic child with marked need for attention and to create sensation and to punish others.	In service 48 months. Electrician mate first class.
	Age 1. I would seem that he is not to continue interviewing for the time being despite the fact that he is neurotic and has conflicts which need solution. He has shown himself to be rather uncooperative.	
14	The contact with him was good and I am under the impression that the possibility as far as the relationship is concerned.	In service 29 months, 20 months Korea. Sgt., radio operator. No disciplinary record or history of psychiatric contact.

# PRESERVICE FACTORS AND PSYCHONEUROSIS

**Table 3** *Ea ly psychiatric comments and subsequent service experience—  
Cont nued*

Case No	Psychiatric comm nt	Experience in service
<i>Favorable comment with favorable outcome</i>		
15	The examination of this boy reveals as normal as the examiner has seen. He apparently is free from all conflict and does not display any objectionable behavior.	In service 40 months, in Europe 16 months. Staff sergeant platoon sergeant. Bronze Star Medal for action in France and Germany. Superior efficiency rating.
16	Age 11. He seems reasonably stable except for the emotional display during the discussion on school.	In service 43 months. 27 months in India, gt., radar operator and radar repairman. Excellent character and efficiency ratings.
17	Age 16. I feel that he is going to continue to get along well.	In service 62 months, in Europe 25 months. Captain type 1st service officer. Excellent and superior ratings.
18	This boy seems to be rather unusually well adjusted. He is well poised and gives no marked evidence of emotional tension. If anything he is rather too well controlled and possibly lacking in the usual boyish vivacity and spontaneity.	In service 58 months, Pacific 9 months. gt., machine gunner and gun commander. Expert infantry badge. Excellent character and efficiency ratings.
19	He seems to be under no emotional difficulty and should make an easy adjustment at the training school.	In service 39 months, China-Burma-India 18 months. Sgt. airplane and engine mechanic and maintenance technician. Excellent character and efficiency ratings.
20	He is making good adjustment, not only as his speech improves, but as he is capable of aggressive behavior.	In service 54 months. 31 months in Panama. 1st Lt., depot supply officer. Efficiency reports excellent.
21	I am left the impression that he has good hold on himself and that his delinquency is under control. I think that he is going to get along very well.	In service 45 months. Sgt. tertiary technician. Excellent character and efficiency ratings.
22	His problem does not appear to be serious one. Mother was assured that she had no reason to be worried about him.	In service 43 months. 23 months in Pacific. Sgt. serviceman. Excellent character and efficiency ratings.

In the earlier sample there were only 13 out of 110 cases with definite psychiatric comments. In the present sample there are 22 out of 98. For the two samples combined, these 35 cases can be classified into three groups:

1. Unfavorable comment with unfavorable outcome 19 cases
2. Unfavorable comment with favorable outcome 3 cases.
3. Favorable comment with favorable outcome 11 cases.

There were no cases with favorable comment and unfavorable outcome.





# Glutethimide (Doriden) Therapy and Overdosage

## A Review with Report of a Case

LIEUTENANT BRADLEY E. SMITH, MC, USN  
CAPTAIN DANIEL M. PINO, MC, USN

GLUTETHIMIDE (DORIDEN), the sixth most frequently prescribed sedative hypnotic in this country,<sup>1</sup> is one of a group of anticonvulsant di-oxopiperidine derivatives. It is absorbed with great variation. Fifteen hours after ingestion of normal doses of C<sub>14</sub> tagged glutethimide 40 percent is excreted, 34 percent remains in the intestine and 0.1 percent is in the brain and cord.<sup>2</sup> Whole tablets of the drug have been recovered from the stomach at autopsy 67 hours after ingestion of high doses. This may be related to its insolubility or to an 'intestinal anesthesia'. Absorption appears to be enhanced by alcohol.<sup>2</sup> Eighty-five percent of ingested glutethimide can be recovered from a biliary fistula. It is reabsorbed by the intestine and excreted by the kidney.

After the ingestion of 1 gram of glutethimide 1 to 3 mg per hour is excreted in the urine for as long as 60 hours. Ten to 30 percent is excreted as free alpha-phenylglutaramide; none is excreted unchanged. In cases of overdosage, a red tan precipitate has often been reported in the urine after standing 24 hours.

Narcosis develops in the human when blood levels reach 2 to 3 mg per 100 cc.<sup>3</sup> Coma of 2 to 3 days has followed ingestion of 5 grams.<sup>4</sup> Fatal dosage has been as low as 10 grams especially when alcohol or other depressants have also been ingested.<sup>4</sup>

Habituation has recently been reported,<sup>5</sup> and reference is made to seizures during withdrawal of the drug.<sup>5</sup> In animals no toxicity has been observed after several months of continuous use in normal dosage.<sup>6</sup>

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## OVERDOSAGE AND ITS THERAPY

There have been reports of at least 27 cases of serious intoxication from glutethimide with 7 fatalities<sup>29-34</sup> The course of intoxication is progressive beginning with lethargy and confusion and continuing through garbled speech flushed face coma total flaccid paralysis, areflexia and respiratory and circulatory collapse In fatal cases necropsy has characteristically revealed cerebral edema, perivascular hemorrhage hemorrhage of the galea and pulmonary congestion One case displayed massive adrenal infarction

No characteristic laboratory findings are consistently noted Spinal fluid pressure has been reported as nearly normal Blood carbon dioxide concentration tends to be high and a high blood urea nitrogen was reported in a fatal case Normal blood sugars have been noted A rising white blood cell count often accompanies prolonged coma Blood levels as high as 6.8 mg per 100 cc of glutethimide have been seen in a nonfatal case

Typically in addition to coma paralysis and varying levels of hyperreflexia there is tachypnea with 30 to 40 shallow respirations per minute Abundant tenacious bronchial secretions are the rule and pulmonary congestion pneumonia and hyperpyrexia often follow Diligent tracheobronchial suction maintenance of an airway (often tracheostomy is required) and oxygen therapy are essential Circulatory collapse and persistent tachycardia are characteristic in more severe cases Amphetamine and levarterenol have been effectively used for support of the blood pressure Effective gastric lavage is an early requirement Urethral catheterization with an hourly record of output is advisable Fluid intake should probably be limited to 1,000 cc daily to prevent cerebral edema Electrolyte intake should replace estimated losses only Prophylactic antibiotic therapy should be considered

A peculiar tendency to lapse into coma after initial response to therapy is a feature of many cases and may perhaps be due to renewed intestinal activity with concurrent absorption of remaining glutethimide Coma frequently lasts from 36 to 72 hours in nonfatal cases During manipulations of the patient apnea frequently occurs At least 1 case of cardiac arrest is described

The use of bemegride as the stimulant of choice has been advocated although the drug is now known not to be a metabolic antagonist of glutethimide Bemegride is administered intravenously in 25 to 50 mg doses at 1 minute intervals until some return of reflexes or improvement of vital signs is noted No attempt should be made to

## DORIDEN OVERDOSAGE

administer sufficient drug to arouse the patient. If, as in the case reported below, bemegride is unavailable, caffeine sodium benzoate may be used cautiously with similar effect, in doses of 0.5 grams every 4 hours for 4 doses.

If no improvement is observed after 800 to 1,200 mg of bemegride has been given or if convulsions occur, or if the condition is steadily deteriorating, the use of an artificial kidney is strongly recommended. Glutethimide is removed from the blood by the artificial kidney 100 to 400 times more rapidly than by the human kidney. In one case with an initial blood level of glutethimide of 3.1 mg per 100 cc, over 3 grams were removed during the first 4 hours of use of the kidney, but the rate of recovery thereafter fell rapidly.

## CASE REPORT

A 19-year old white sailor was discovered comatose and totally unresponsive to painful stimuli at 0.30 hours 10 February 1959. History revealed that he had ingested 11 grams of glutethimide at 0100 hour but at 0.30 hours had been easily awakened by a shipmate. On the same evening he had taken two alcoholic drinks but no other drugs.

### First Day

*0900 hours* Physical examination on admission revealed the following: height 5 feet 7 inches, weight 155 lb, respirations 20 per minute and deep blood pressure 100/0 mm Hg, pulse 120 per minute and temperature 100.6 F rectally. Head, heart, lungs normal, bowel sounds absent. The patient was comatose and completely flaccid. Pupillary light reflexes were minimal, corneal reflexes absent, deep tendon reflexes hypoactive and there was minimal withdrawal response to painful stimuli.

Laboratory data: serum sugar 95 mg per 100 ml, sodium 135 mEq per l, potassium 5.5 mEq per l, carbon dioxide 30 mEq per l, chlorides 107 mEq per l, Hb 15.5 grams per 100 ml, hematocrit 41 per 100 ml, white blood cell 10,000 per cu mm and urinalysis normal.

Gastric lavage was performed and continuous drainage instituted. A urinary retention catheter was inserted, and the patient was given 5 percent glucose infusion. Intravenous injection of 1 cc of caffeine sodium benzoate caused transient slight increase in tidal volume.

*1.30 hours* Blood pressure 110/70 mm Hg, pulse 110, respirations 32. Respiratory volume was 4,400 cc per minute. Urinary output had been 1.0 cc per hour. With the exception of bilateral minimal pupil and Achilles reflexes, all reflexes and responses had disappeared. The patient was placed in an oxygen tent.

*1.61 hours* Vital signs and respiratory volume were unchanged. No reflexes remained. The pupils were dilated and fixed, and urinary output was 0 cc per hour.

Because of the rapid deterioration of the clinical picture the patient was transferred to Bellevue Hospital for extraction of the drug by use of the artificial kidney.

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not be obtained from any laboratory in the area. Iophylactic antibiotic  
therapy was instituted.

## Second Day

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## SUMMARY

The course of intoxication following overdosage with glutethimide has been described and recommendations for therapy are made. After a review of reports of serious intoxication appearing in the literature a nonfatal case of intoxication after ingestion of 11 grams of glutethimide is presented. In large doses the drug has a long often unpredictable period of absorption and excretion. Intoxication from overdosage although occurring relatively infrequently may be difficult to treat. In cases of overdosage if any deterioration of the patient's condition develops his management should probably be undertaken at an institution equipped with an artificial kidney.

**ACKNOWLEDGMENT** The authors wish to express their appreciation to Dr. Robert S. Hightsham, Director of the Naval Logistics Service, for his contribution to the development of the program, and to the staff of the Naval Logistics Service, for their assistance in the preparation of this report.

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## HOW TO BECOME AN ALCOHOLIC

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# Ligamentous Disruption of the Knee

## A Review with Analysis of 28 Cases

COLONEL STERLING J. RITCHEY, MC, USA

TRAUMATIC DISRUPTION of knee ligaments is a disabling event resulting in an unstable knee that becomes a lifelong handicap in weight bearing. In the military service with its rigorous weight bearing requirements the rate of separation from the service because of chronic knee instability is unnecessarily high. It is believed that with this incapacity only those military persons performing very limited and sedentary duties are fit for continued military service. The recurrent "giving way" of the unstable knee is a painful and disabling event that occurs with a frequency directly related to weight bearing physical activity. Each episode results in pain, effusion of the knee, and further insult to articular surfaces and soft tissue support. The end result of continued knee instability is progressive, irreversible, degenerative arthritis.

It is well known that the results of late reconstruction of ligaments are less than satisfactory,<sup>1</sup> and it has been thought that failures to obtain stability were probably due to technical errors or absorption of the transposed material. Fascia lata and tendons have been used as cruciate ligament substitutes with unsatisfactory end results. There is a good anatomic reason for the failure of these late reconstruction attempts no matter what the technic or variations. A ligament is primarily a joint stabilizing mechanism and cruciate ligaments are characterized by a unique anatomic configuration. The functional role of ligaments is different from that of tendons and fascia, which resist or transmit linear tensile forces only. Fascia and tendon fibers are arranged in parallel fashion, those of tendons lying as a simple bound cable. On the other hand a cruciate ligament, whose role is to provide joint stability in all ranges of motion, is composed of fibers that decussate freely to allow some to be taut at

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any joint position. Substitution of a tendon or fascial strip with its parallel fibers in the bed of the anterior cruciate ligament results in a knee that is stable in full extension but progressively unstable as flexion increases. This repair of course offers the patient little benefit because the quadriceps sleeve anteriorly and the hamstring tendons posterolaterally and posteromedially supply sufficient stabilizing force for the knee in extension. On the other hand with the knee in slight flexion this sleeve muscle mechanism is inoperative and the knee then depends upon its ligaments for support. Substitution of tissue for cruciate ligaments is thus doomed to failure.

The person with the unstable knee can be taught to assume a gait of full extension in weight bearing and cautioned to avoid unguarded weight bearing movements, strenuous weight bearing activity, and uneven surfaces in walking and the thigh musculature can be strengthened. But it is only restoration of ligamentous continuity by early reparative surgery that can assure the patient a functional knee for the remainder of his life. One can anticipate almost uniformly successful and gratifying results if this is accomplished as has been reported in a series of athletic injuries. One can certainly offer a gloomy prognosis if the ligaments are neglected. The reconstitution of this tissue is just as important as the repair of any other surgically accessible tissue in the body.

## ANATOMY

The ligamentous support of the knee is composed primarily of the medial and lateral collateral and the anterior and posterior cruciate ligaments. The anatomy and role of each ligament in stabilization of the knee has been well studied and reported. An accurate knowledge of this anatomy however is essential for operative repair as well as for understanding the pathomechanics of the injury and for meaningful examination of the injured knee.

The cruciate ligaments lie in the intercondylar notch and stabilize the knee primarily in the anteroposterior direction although torsional and angular force is resisted by their obliquity as well. The ligaments themselves are surrounded by fatty synovial tissue and form an almost complete ligamentous mass in the intercondylar notch. They are decussating ligaments the most anterior fibers at origin decussating to the most posterior portion of the ligament at its insertion. These crossed ligaments and the decussating intrinsic arrangement allow for stability in all ranges of motion.

The collateral ligaments primarily stabilize the knee against



## LIGAMENTOUS DISRUPTION OF KNEE

angular force. These ligaments do not have the same intrinsic decussating fiber pattern, but the medial collateral ligament has its posterior portion composed of oblique interdigitating fibers that perform the same function as decussation in stabilizing the knee in all positions of flexion or extension. The fibers represent essentially a reinforced thickening of the quadriceps fascial sleeve and capsule, taut in full extension, slightly relaxed in flexion. The lateral collateral ligament arises from the lateral femoral condyle, lies on the surface although free from the joint capsule, and is intimately related to the lower fascial lata distally. The medial collateral ligament has a similar origin and insertion, intimately associated with the lower insertion of the thigh adductors, but it is worthy of note, surgically, that the insertion of this ligament lies some 3 inches below the joint line. This ligament actually passes beneath the medial hamstring tendons as they insert on the tibia at the junction of its metaphysis and shaft and passes deep to these tendons to insert distally on the tibial shaft. In addition, both medially and laterally there is a deep layer of collateral ligament. This short ligament arises from the same site proximally, is intimately associated with the capsule forming a sturdy base of attachment for the meniscus, and inserts along the plateau rim of the tibia with the capsule.

## CLINICAL FEATURES

The force required to rupture the continuity of these ligaments is, of course, considerable. Most ruptures occur not from the usual twisting injury, but from forceful contact such as occurs in certain sports, or such as the blow of a moving vehicle against the leg when the foot is fixed upon the ground. Not infrequently, ruptures are caused by falls downstairs or from heights with a twisting angular force applied through the knee. The resultant pathologic triad is well known. With force applied to the knee from the lateral side the usual result is a tear of the medial collateral and anterior ligaments, injury to the medial meniscus, or compression against the lateral tibial plateau if ligaments fail to separate. When force is applied to the inner aspect of the knee, the opposite is involved. The common effect of hyperextension is rupture of the anterior ligament as gliding extension is checked, and the joint is forced open like a book posteriorly.

Usually the patient can describe the mechanism of injury and the force that was applied to his knee, and the

for location of the lesion. He will state that the force applied was severe and that he felt a tearing giving way of the knee with excruciating pain and immediate consciousness of instability on attempting to stand and bear weight. There is a distinctive tearing sensation as opposed to the snapping painful pop of the isolated damaged meniscus. Roentgenograms are not essential and usually are not helpful although they may be useful in ruling out plateau fractures on the opposite side and in serving as visual evidence of the instability which might be indicated in some medicolegal situations. If the knee is seen within 30 minutes of injury effusion swelling and pain on motion are usually not severe enough to prevent examination for ligamentous integrity. In the ensuing 2 hours however the picture is altered by the presence of bleeding within or about the joint protective muscle spasm and apprehension on the part of the patient. Effusion is not generally a feature of this injury inasmuch as a tear of a collateral ligament always results in laceration of the synovium with resultant escape of joint fluid. In the isolated cruciate tear however as seen in hyperextension injury and tear of the posterior cruciate ligament there may be brisk bleeding and considerable tension within the joint.

If the collateral ligaments are involved tenderness can be elicited with almost pinpoint accuracy at the site of rupture. The most common injury involves the medial collateral ligament and this ligament is most commonly torn from its tibial attachment distally so that this is the point of maximum tenderness. Usually tenderness is elicited medially in the joint line indicating disruption of the deep layer of this same collateral ligament. Full extension of the knee may be obtained by gentle manipulation unless an associated locked meniscus is present. When the patient is seen perhaps 12 or 24 hours later ecchymosis is usually present distally along the flare and shaft of the proximal portion of the tibia. The points of tenderness are discrete and the joint is free of effusion.

The usual method of testing the stability of the collateral ligaments is satisfactory for diagnosis (fig 1). Gentle opening of the extended knee with careful palpation of the joint space as gentle pressure is applied will reveal abnormal opening of the joint space. The feeling is characteristic and the examination can be done at any time following injury if done in a nontraumatic manner. Forceful manipulation is neither warranted nor necessary. Testing for cruciate stability by the method of driving the tibia forward and pushing it backwards on the femur with the knee in flexion the so called 'drawer' sign or manipulation is unsatisfactory. It is a painful procedure and is

## LIGAMENTOUS DISRUPTION OF KNEE

resisted by the patient with muscle spasm with the knee flexed at approximately 90°, tension of the spastic protective hamstrings will lead to false findings and frequently to a false negative test. The hamstring tendons can easily overpower manual attempts at sliding the tibia forward on the femur. Cruciate testing is best performed with the knee in full extension, at which position the hamstrings or quadriceps cannot resist the examiner by contraction.

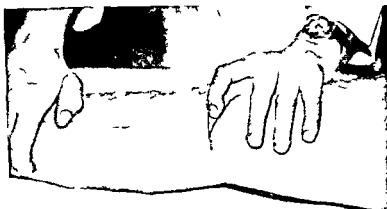


Figure 1 Test for integrity of medial collateral ligament. The joint space is opened beneath the palpating index finger.

To test the anterior cruciate, the knee is extended in a comfortable position (fig. 2). The palpating index finger is placed in the small triangle formed by the curved femoral condyle and straight tibial plateau medially. The palm of this same hand stabilizes the femur while the second hand gently lifts the tibial plateau anteriorly. If instability is present, the tibial plateau can be easily palpated sliding forward under the palpating finger.

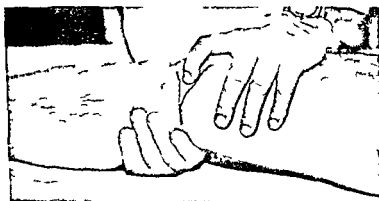
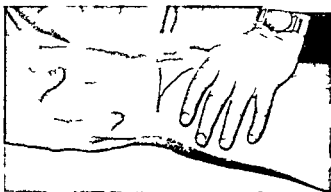


Figure 2 Anterior cruciate testing. The tibial plateau is lifted ante only.

To establish the integrity of the posterior cruciate the maneuver and hands are reversed (fig 3) The examining finger of the second hand is placed in this same triangle between femoral condyle and tibial plateau the palm stabilizing the tibia Then the first hand placed beneath the femoral condyle gently draws them forward the motion being easily palpated by the examining finger Hyperextension of the knee indicates loss of continuity of the posterior cruciate (fig 4) The uninjured knee must be examined for comparison



Fig 3 Post r r u t testing Th f m l  
ondyl re lifted ant ly



Figur 4 Hyper t ns n indicat po t r cru iat  
disruption.

An accurate diagnosis of what structures are damaged and the extent of damage must be made and this cannot be deferred during

## LIGAMENTOUS DISRUPTION OF KNEE

trial of conservative therapy in hopes that later reconstruction, if necessary, will result in a serviceable knee. With gentleness and care, the diagnosis can be made in practically all cases. If the patient's discomfort and apprehension preclude examination, the physician is justified in examining the damaged knee under anesthesia, as the future of this extremity in weight bearing depends upon early accurate diagnosis. Once the diagnosis of complete disruption of one or more ligaments of a previously stable or normal knee is made, surgical repair is indicated unless age or other disabilities contra-indicate, or unless the occupation of the patient does not require a strong stable knee. Incomplete tears present the symptoms and signs of a complete tear, that is, pain, tenderness, and ecchymosis, but do not demonstrate instability on the tests described above. These incomplete tears or "sprains" are best treated by immobilization in a long leg plaster cast, with the knee flexed between  $135^{\circ}$  and  $150^{\circ}$  to allow healing of the ligament in the relaxed position.

### TREATMENT

Surgical repair must be performed promptly following the diagnosis of ligamentous disruption. However, this is never an emergency procedure and time should be taken for thorough skin preparation and thorough evaluation of the patient. The operation can then be scheduled in 24 to 48 hours. A longer wait is justified if surgical incisions would otherwise be made over abraded contaminated skin. The operation itself is performed under regional or general anesthesia, with tourniquet control and with adequate operating room facilities and personnel.



Figure 5 The parapatellar incision extended distally and curved posteriorly to expose collateral and cruciate ligaments

If the medial aspect of the joint has been damaged a long median parapatellar incision is used extending distally and curving posteriorly at the junction of the metaphyseal flare and shaft so that both collateral and cruciate ligaments can be approached and repaired as the injury indicates (fig 5). After the medial skin flap has been reflected the superficial layer of the collateral ligament may be inspected with manipulative opening of the medial joint space. As indicated earlier the site of disruption is usually found distally and may be completely hidden by the hamstring tendons unless these are retracted and the ligament traced to its insertion. The superficial laceration is opened widely by extending the incision transversely and proximally toward the patellar tendon to permit a median parapatellar exposure of the joint space itself. This superficial ligament layer is reflected proximally and medially and the status of the deep layer is evaluated.

If the deep layer is torn from the tibia inspection of the meniscus and cruciate ligaments is simple. When cruciate damage is present, the incision as mentioned is extended proximally in the median parapatellar route and the patella dislocated laterally to expose the intercondylar notch. The knee is then placed in flexion and meniscectomy and repair of the cruciate ligaments is accomplished as indicated.

If the anterior cruciate is detached from its anterior bony insertion it is simply reattached by pulling the ligament back to its bony bed with a suture passed through a drill hole and tied superficially in the soft tissue below the joint level. This draws the cruciate back to its normal insertion where it can be expected to heal. If the posterior insertion is avulsed a drill hole is passed posteriorly transversely through the lateral femoral condyle from its bed of origin; the bone is freshened and a simple pull through suture is tied over a small buttress of gauze on the knee posterolaterally thus holding this ligamentous repair in place for reattachment.

The anterior attachment of the posterior cruciate is similarly treated if necessary. The posterior tibial insertion however is quite difficult unless anterior cruciate avulsion allows visualization. The bony bed is palpated behind the anterior cruciate and freshened with a curet. The ligament is pulled to it by a suture passing a blunt ligament passer posterolaterally through the popliteal space over the bony bed to draw the ligament into place.

Disruption of these ligaments in continuity require simple suture only. This is accomplished with the knee bent at about 135 to 140 and then this portion of the incision is closed. The deep and super

## LIGAMENTOUS DISRUPTION OF KNEE

ficial layers of the collateral ligament are next repaired by simple suture in their normal position and with normal suture tension. The meniscus is not removed unless torn from its base on the deep layer of the collateral ligament and capsule.

The knee is maintained in a long leg plaster cast with the knee flexed at 135 to 150 postoperatively for 21 days, at which time healing is considered to be adequate for gentle motion. At this time, supervised motion is started in flexion only, utilizing the cast shell for protection and to prevent extension. Six weeks after surgery extension from this position is initiated. Extension is delayed for this period because it produces tension upon these repaired ligaments. Rehabilitation is slow and the average time to regain full extension with recovery of quadriceps power to normal is about 16 weeks. Return to full military duty should be delayed until these criteria are met.

### ANALYSIS OF CASES

Twenty eight consecutive cases treated by the author between 1947 and 1958 are presented. Most of these patients were young active men between 20 and 28 years of age, except for one 42 year old patient. All injuries were the result of severe force 75 percent having been incurred as athletic injuries, and the remainder as the result of twisting force in falls usually from a considerable height. Only one was incurred in an automobile accident.

Analysis of the operative findings indicates the following distribution of ligament damage:

Anterior cruciate only (torn meniscus 6)	11
Anterior cruciate and medial collateral (torn meniscus 1)	7
Medial collateral only	4
Anterior cruciate posterior cruciate and medial collateral	4
Posterior cruciate and lateral collateral	1
Posterior cruciate only	1
Total	28

A torn medial meniscus requiring removal of the fragment was present in only 5 cases. In two additional cases both menisci were torn. All meniscus tears were associated with an isolated anterior cruciate tear except one, and this involved a tear of both anterior cruciate and medial collateral ligaments. There was no instance of tear of the meniscus from its attachment when only the medial collateral ligament had been disrupted. Five cases of isolated anterior

cruciate tear were not complicated by tear of the meniscus. This suggests that abnormal anterior displacement of the tibia on the femur is the mechanism of tear of the meniscus rather than forceful opening of the medial joint space.

One complication occurred in the form of a severe postoperative wound infection involving the joint which required surgical drainage and prolonged antibiotic administration. This patient was separated from the service because of limitation of motion and scarring about the knee. The knee, however, was stable.

All other patients returned to full military service with stable knees and normal range of motion, all having full powerful extension and flexion past 90°.

## SUMMARY

The anatomy of the knee ligament and the clinical features of disruption of these ligaments are reviewed. Surgical repair of ligamentous disruptions is detailed and an analysis of 98 operative cases is presented.

A plea is made for the early surgical repair of disrupted knee ligaments. The results of delayed reconstructive procedure are disappointing and it is only by early ligament and early medical repair that a stable functional knee can be assured.

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# The Headache Problem

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HEADACHE is one of the most frequent complaints confronting the clinician whatever his specialty. It has been estimated that 50 percent of patients encountered in general practice suffer from headache.<sup>1</sup> In an unselected group of 10,000 men between the ages of 18 and 38 who were examined for military service during World War II, 8 percent complained of severe headache.<sup>2</sup> In a large industrial plant, an investigation into the medical reasons for 15,000 absences among employees revealed that 24 percent were due to headache.<sup>3</sup> Tunis and Wolff claim that 70 percent of the population have headache at one time or another.

Yet despite its frequency and importance, the headache problem has been neglected. It may receive little attention in the medical school curriculum, is seldom the topic of interest of more than a few doctors, and too often is left to some one else to worry about—usually the suffering patient. And with neglect have come carelessness in diagnosis, misconceptions about etiology, errors in treatment, and dissatisfied patients who at times seem destined to be afflicted forever with the scourge of headache.

It is the attempt of this review to outline the subject of headache to dispel some of the misconceptions associated with it, and to offer a simple, working classification of headaches together with their characteristics, mechanisms, and treatment.

## MISCONCEPTIONS

Misconceptions concerning the causes of headaches are almost as common within the medical profession as among the lay population. Contrary to popular belief, headache can rarely be attributed directly to diseases of the eyes, ears, paranasal sinuses, nose, or teeth. Even when abnormalities are discovered in one of these areas and are remedied, the patient may find his headache unabated.

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Many also describe a causal relationship between headache and constipation, menstruation, pregnancy, the menopause, vitamin deficiency, allergy, and hormone imbalance. Yet seldom do these factors have any direct etiologic significance. Neither is there any direct relationship between elevated cerebrospinal fluid pressure and headache. It has been demonstrated that the experimental increase of cerebrospinal fluid pressure to over 100 mm of water does not produce headache in the normal subject. Again headache has been produced on the side of the lesion in a patient with brain tumor by lowering the intracranial pressure but not by elevating it to 100 mm.

### CLASSIFICATION OF HEADACHE

Basically, headache depends upon the stimulation of extracranial or intracranial pain sensitive structures. All tissue, especially the arteries overlying the cranium, are to a greater or lesser extent sensitive to pain. In addition, the various tissues about the face and neck (that is, the eyes and ears and their component parts, the nose, paranasal sinuses, etc.) are pain sensitive and may occasionally, when stimulated, be a cause of cephalgia.

The intracranial pain sensitive structures include the great venous sinuses and their venous tributaries from the surface of the brain, parts of the basal dural venous sinuses, the dural arteries, and cerebral arteries at the base of the brain, and the fifth, ninth, and tenth cranial and upper 3 cervical nerves.

The mechanisms of headache of extracranial etiology are numerous and diverse. The vascular headaches result from an inflammatory process, such as cranial arteritis, or from extracranial vascular dilatation, as in migraine or histaminic cephalgia. Tension headache is probably due to autonomic nervous system stimulation. Those rare headaches which are caused by localized disease of a specific extracranial structure, such as the eyes, ears, or teeth, may have any one of a number of mechanisms—inflammation, direct compression, direct stimulation of a nerve ending, or muscular strain and spasm.

However, the basic mechanisms of intracranial headache are limited in number. Wolff considers six: (1) traction on veins that pass to venous sinuses from the surface of the brain, and displacement of the great venous sinuses; (2) traction on the middle meningeal arteries; (3) traction on the large arteries at the base of the brain and their main branches; (4) distention and dilatation of the intracranial arteries; (5) inflammation in and about the pain sensitive structures; and (6) direct pressure on the cranial and cervical nerves containing afferent fibers from the head.

## HEADACHE

On the basis of the pain sensitive structures and mechanisms, one can formulate the following classification of headache

### I HEADACHE OF EXTRACRANIAL ETIOLOGY

#### A Nonvascular Headache

- 1 Sustained muscular contraction headache (tension headache)
- 2 Disease of the eyes
- 3 Disease of the nose ears and paranasal sinuses
- 4 Disease of the teeth and gums
- 5 Disease in and about the neck

#### B Vascular Headache

- 1 Disease of the superficial cranial arteries (cranial arteritis)
  - 2 Fever foreign protein reaction and reactions to  
bacterial and other toxins
  - 3 Histaminic headache
  - 4 Hypertensive headache
  - 5 Migraine headache
- } Respond to ergot derivatives } Due to extra cranial vasodilatation

### II HEADACHE OF INTRACRANIAL ETIOLOGY

- 1 Inflammatory lesions
- 2 Space-occupying lesions
- 3 Organic intracranial vascular lesions
- 4 Cerebrovascular accidents

### III MISCELLANEOUS HEADACHES

- 1 Post-traumatic headache
- 2 Post lumbar puncture headache
- 3 Postpneumoencephalography and postventriculography headache
- 4 Dehydration headache

## CLINICAL FEATURES

*Tension headache* Tension headache is by far the most common type of headache seen in the general practice of medicine and alone probably accounts for 90 percent or more of all headaches

In contrast to migraine headache prodromata are characteristically absent. The pain typically involves the frontal and occipital regions but may involve the entire head in a caplike distribution. It is usually described as pressure like viselike, or resembling a tight hatband and is invariably associated with a sensation of tightness or spasm of the posterior neck and shoulder muscles. Frequently, there will be palpable spasm or even tender nodules within the musculature of the head neck and upper back. There may be associated anxiety, nausea and vomiting the latter two features frequently being responsible for the incorrect diagnosis of migraine. The frequency and duration of the headache is variable but rarely lasts less than 1 hour, often persists for an entire day to 3 or 4 days, and may last for several weeks.

Friedman von Storch and Merritt<sup>5</sup> reviewed 1,000 cases of tension headache, of which 60 percent were female and 40 percent had

### *Headache due to disease of the eyes ears nose, sinuses and teeth*

Headache secondary to disease of the eyes is rare. Refractive errors may at times be responsible for head pain but such discomfort is invariably clearly related to excessive use of the eyes and is felt in the immediate vicinity of the eyes. Frank abnormalities such as inflammatory lesions and glaucoma may produce severe eye and head pain but signs of ophthalmic disease will usually be apparent. While it is agreed that ocular muscle strain can cause headache the post movie headache may be due as much to the emotional experience in seeing the movie as it is to strain of the ocular muscles.

Disease of the ears nose and paranasal sinuses may be a cause of headache but will almost always be accompanied by symptoms referable to these areas and signs of local pathologic change. However it is important to remember that the frequent association of migraine headache with unilateral lacrimation conjunctival injection edema of the nasal mucosa nasal stuffiness and rhinorrhea may result in the false diagnosis of upper respiratory disease.

Headache of dental origin is not common. Wolff has demonstrated that electric stimulation of a tooth will cause pain in the area of the tooth and produce homolateral headache of the face and temple lasting a considerable time after cessation of the stimulus and after the local pain has disappeared. Headache may also appear as the result of erupting impacted third molars. However headache which results from dental disease is usually accompanied by pain in the tooth itself leading to proper diagnosis.

*Headache due to disease in and about the neck* Tightness of the posterior neck muscles is common in tension headache. However primary disease of the neck and its associated structures such as osteoarthritis herniated disc myositis and bruises, may initiate headache. Therefore the neck should be examined carefully in all cases of headache.

*Headache due to cranial arteritis* The headache of cranial arteritis is caused by direct inflammation of the involved vessels usually the temporal or occipital arteries with swelling tenderness and loss of pulsations of the involved vessels. Mental confusion and diminished auditory and visual acuity may be observed. Fever elevated erythrocyte sedimentation rate and leukocytosis are often present. Salicylate steroid and anticoagulant therapy may constitute sufficient treatment. Excision of the involved vessel usually results in cure and confirms the diagnosis.

*Headache due to fever foreign protein and toxins* When histamine is injected intravenously into the normal subject generalized

vascular dilatation and transient fall in blood pressure occur. Because the peripheral vasculature regains its normal tension and caliber before the intracranial vessels contract, the intracranial vessels are still dilated during the return of systolic force. This produces still greater dilatation and pulsation and results in severe throbbing headache. Headache caused by fever, infection, and the injection of foreign protein or toxins is said to have this same mechanism.<sup>12, 13</sup> Similar headaches result from exposure to low oxygen, as in carbon monoxide poisoning or sudden fall in blood pressure from any cause with resultant hypoxemia and painful, compensatory intracranial vascular dilatation. Because these headaches do not respond to vasoconstrictor drugs, relief depends mainly on analgesics.

*Histaminic headache* Histaminic headache was first described by Horton<sup>14, 15</sup> and is variously referred to as "Horton's syndrome," "Horton's headache," "autonomic cephalgia," and "cluster headache." It is characterized by the explosive onset of severe, unilateral, throbbing, or burning pain in the temple, eye, forehead, cheek, or region behind the ear and upper part of the neck. It is often associated with homolateral tearing, miosis, enophthalmos and conjunctival injection, ipsilateral rhinorrhea and nasal obstruction, facial flushing and sweating, and occasional nausea and sialorrhea. It usually occurs in men after the age of 40 and at night, frequently rudely awakening the patient 1 or 2 hours after he has gone to sleep. It lasts from 15 minutes to several hours and may be of such severity as to cause crying and thoughts of suicide. These headaches often appear in clusters, occurring every day or night or several times a day or night for weeks, months, or years. Sometimes a patient never has a recurrence after a single cluster, or at the other extreme the period of freedom may gradually shorten until he is suffering from daily headache for years. An injection of histamine subcutaneously (0.35 mg) will often precipitate a classic headache during the time the patient is susceptible. However, generalized headache immediately following subcutaneous histamine and lasting 5 to 10 minutes should not be confused with a positive test for histaminic cephalgia. This initial headache is called a histamine headache and occurs even in the normal subject who receives histamine parenterally. The typical attack of histaminic cephalgia will occur 15 to 50 minutes after cessation of the histamine headache. A positive test is obtained in 60 percent of cases.

The mechanism appears to be localized dilatation of branches of the external carotid artery, and an attack is usually rapidly terminated by the administration of a vasoconstrictor drug such as epinephrine or one of the ergot derivatives. Antihistamines are seldom of benefit. Histamine desensitization to prevent future attacks is still considered

produces visual and other pre headache phenomena. This is followed by dilatation and distention of branches of the external carotid artery usually the superficial temporal branch with stimulation of pain sensitive nerves in and around the vessels. This may be followed or accompanied by contraction of head and neck muscle with tension headache resulting either from direct stimulation of nerve endings or from ischemia of the muscles. Recent work indicates that a local substance in migraine headache lowers pain threshold and damages tissue. When edema fluid which accumulates about the dilated vessels at the area of headache is removed and analyzed its amino acid content is found to be increased as the result of local protein breakdown. When injected intracutaneously into other areas this edema fluid produces erythema and slight decrease in cutaneous pain threshold.

The cause of migraine headache is not known but emotional factors are of great importance. Frequent mention is made of the migraine personality—a compulsive meticulous rigid anxious and intelligent person who is hypersensitive over conscientious and a perfectionist, irritable toward his environment and resentful of his lot in life. However there is no conclusive evidence that a distinct migraine personality pattern exists.

As in the treatment of tension headache psychotherapy is of utmost importance in controlling the frequency of headaches. However unlike drug therapy in tension headache medications for combating migraine are successful and specific. They act as vasoconstrictors on branches of the external carotid arteries. The success of a drug in rapidly aborting an acute attack of migraine is enhanced if the patient takes it during the prodromal stage at the very first sign of the syndrome rather than awaiting the presence of actual head pain. The immediate treatment of migraine is said to be most effective with oral or rectal ergotamine tartrate and caffeine (Cafergot). However any of the following ergot derivatives may be used successfully.

- 1 Dihydroergotamine 1 ml (1 mg) IV
- 2 Dihydroergotamine 1 ml (1 mg) SC
- 3 Cynergen (ergotamine tartrate) 0.5 ml (0.25 mg) IM
- 4 Cafergot tablet 2 tablets followed by 1 tablet every 30 minutes until relief is obtained or until a total of 6 tablets have been taken.
- 5 Cafergot suppositories 1 suppository followed by an additional one in 60 minutes if required.
- 6 Cafergot P.B. tablet 2 tablets followed by 1 tablet every 30 minutes until relief is obtained or until a total of 6 tablets have been taken.

## HEADACHE

7 Cafergot P-B suppositories 1 suppository followed by an additional one in 60 minutes if required

8 Ergotamine tablets 2 tablets followed by 1 tablet every 30 minutes until relief is obtained or until a total of 6 tablets have been taken

The suppositories have been most useful in cases where vomiting prevents retention of oral medication. Cafergot P-B contains pento barbital sodium and an antispasmodic to combat nervous tension and gastrointestinal symptoms, respectively. Approximately 15 percent of patients are refractory to drug therapy and 30 percent to preventive measures, that is, psychotherapy.

Certain precautions should be taken in using ergot derivatives. The maximum dose of ergotamine is 10 mg in any one day and this should not be given more than once each week. Side effects of excessive ergotamine include nausea, vomiting, paresthesias of the hands and feet, pains in the neck, thighs, and abdomen, and sub sternal oppression. Muscle spasm of the extremities and perivascular pain may occur. The drug is contraindicated in organic heart disease, obliterative vascular disease, hypertension (except for occasional use in the acute phase), pregnancy, liver disease, and septic states associated with intravascular foci.

*Headache due to cranial inflammation.* Headache as a result of cranial inflammation is usually obvious. It is invariably due to direct stimulation of the sensitive areas of the meninges or arteries by the various agents which cause meningitis or by distortion of pain sensitive structure from changes in cerebrospinal fluid dynamics. The usual signs and symptoms of meningitis are invariably present.

*Headache due to space occupying lesions.* Intracranial neoplasms, abscesses, cysts, and hematomas are uncommon causes of headache. The mechanism is distortion of pain sensitive structures by direct pressure on these structures or by spinal fluid pressure changes.

Because one should always rule out brain tumor as the underlying cause for any headache and because patients want reassurance that a neoplasm is not the cause, a detailed discussion of brain tumor headache is in order.

Headache is seldom the sole symptom of brain tumor. Other neurologic symptoms and signs are usually present such as diplopia, hemiparesis, facial palsy, ataxia, reflex changes, and convulsions. Wolff state that when present headache due to brain tumor is usually a deep dull aching pain and seldom of a throbbing quality. It is intermittent, rarely intense, and usually relieved by aspirin or by the application of cold packs to the head. It may be increased in

intensity by coughing and straining at stool and may be worse in the erect than in the recumbent position

Although headache is an aid in localizing the tumor is of limited value it may help significantly in localization if the headache is continuous as it is in 10 percent of cases The following rules are summarized from Wolff

- 1 Headache is usually bilateral but may be unilateral
- 2 Intensity of pain is usually constant but may be intermittent
- 3 In all patients with a tumor headache is usually worse in the morning
- 4 When headache is bilateral it is usually worse in the morning
- 5 Headache is usually worse in the morning
- 6 Headache may be associated with vomiting
- 7 Headache may be associated with papilloedema
- 8 Headache may be associated with focal signs
- 9 Headache may be associated with homonymous hemianopia
- 10 Headache may be associated with homonymous hemianopia

*Headache due to organic intracranial lesions* Hemangioma, arteriovenous fistulae and aneurysms may cause headache resulting from distortion and direct pressure on pain sensitive structures from vascular dilatation and painful stretching of the lesion itself or from hemorrhage

*Headache due to cerebrovascular accidents* Although not a prominent feature of the cerebrovascular accident headache may occur When thrombosis or embolization causes the accident headache probably results from distention and ischemia of the walls of the involved vessels and compensatory dilatation of neighboring arteries Hemorrhage may cause severe pain for the same reasons or as a result of distortion of pain sensitive structures by the expanding mass of blood

*Post-traumatic headache* Headache following trauma to the head and neck is difficult to evaluate It may result from epidural subdural or subarachnoid hemorrhage or be due to localized trauma to the kinesthetic neuritis of the superficial nerves and secondarily vasodilatation It occasionally will result from injury to the ligamentous bones and nerves of the neck or from adhesions in the meninges

*Compensatory headache* Headache following trauma to the head and neck may resemble the type of headache resulting from the stresses of life situations and unrelated to head trauma Compensation neuritis and meningitis may be important in some cases

*Post-lumbar puncture headache* Lumbar puncture headache in the erect position results if 10 ml or more of cerebrospinal fluid is



## HEADACHE

removed.<sup>2</sup> The headache diminishes in intensity or disappears in the reclining position, if the head is held in flexion or extension, or if the spinal fluid is replaced with an equal amount of sterile saline. Although less fluid may be removed during the usual diagnostic lumbar puncture, considerably more may escape from oozing through the hole left by the puncture needle. With loss of fluid, there is an alteration in the hydrodynamic equilibrium, and vessels, especially veins become dilated. With a portion of its fluid cushion removed, the brain sags slightly downward and traction is exerted on pain sensitive structures. Such headaches usually disappear within 7 to 10 days. If the recumbent position is assumed, relief is invariably produced. Analgesics are not usually successful.

*Postpneumoencephalography and postintraculography headache* Withdrawing of spinal fluid and replacing it with air results in distortion of pain sensitive structures and headache. The treatment is the same as for post lumbar puncture headache. Sedation may be of benefit.

*Dehydration headache* Severe dehydration may cause headache as the result of low cerebrospinal fluid volume, sagging of the brain, and traction on pain sensitive structures.<sup>23</sup> It is relieved by rehydration.

## SUMMARY

The problem of headache has been discussed. A classification, together with the clinical characteristics, mechanisms, etiology, and treatment of headaches is presented.

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# Indirect Inguinal Hernia and the Internal Ring

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FEW PROCEDURES have occupied the thought and effort of surgeons as has the repair of inguinal hernia. Yet the recent review by Koontz,<sup>1</sup> who polled members of the American Surgical Association and the Southern Surgical Association on basic aspects of hernia surgery, indicates a wide divergence of opinion. Careful dissection and high ligation of the hernial sac have traditionally been recognized as the *sine qua non* of indirect hernia repair. Subsequent steps in the repair, however, have been treated in so many different ways that eponymic procedures have drawn emphasis away from the varying sized but omnipresent defect in the transversalis fascia—from what Koontz believed is "the core of the whole matter . . . that great care should be used in closing the internal ring."<sup>1</sup>

## REVIEW OF THE LITERATURE

The fact that "there is . . . no unanimity of opinion as to the best type of operation to be used for the ordinary, run of the mine primary indirect inguinal hernia" is perhaps best explained in part on a historic basis. The importance of the transversalis fascia as the major defensive barrier for the abdominal wall in the inguinal region has long been known. Many years ago Cooper<sup>2</sup> described this layer clearly in his dissections. Halsted was careful to include it as the deep layer in his original through and through suture which incorporated both oblique muscles and the transversus abdominis as well. Bassini used it in his triple layer suture incorporating internal oblique, transversus and transversalis fascia. However from the time of Bassini the adoption of a suture line between the internal oblique

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muscle and Louparts ligament initiated a tradition from which hernia surgery has not yet fully recovered.

Along the road a group of purists anxious to repair indirect inguinal hernia by returning the inguinal canal to its normal state followed the path of Marey who in 1841 first sutured together the transversalis fascial margins of the defect at the internal ring beneath the cord. In 1909 Connell stressed the importance of closing the internal ring as a separate layer. By 1928 he had found 9 other authors presenting arguments for this approach. Foremost among these were Andrews and Litzman both of whom presented the case for closure of the internal ring in the clearest prose and with profound knowledge of the anatomy involved. During the past 30 years this concept has had staunch advocates.

Several surgeons<sup>4-6</sup> have been satisfied with closing the ring by suturing the medial margin of the transversalis defect to the inguinal ligament laterally thereby leaving a defect at the superolateral aspect of the cord as it emerges through the abdominal wall. Attention has recently been drawn to recurrences at this site. In virtually all indirect hernias however there is sufficient tissue making up the lateral crus of the transversalis fascia to effect a closure using this layer alone without recourse to the inguinal ligament. By retracting the inguinal ligament and undermining the femoral sheath as the lateral margin McVay and Chapp<sup>7</sup> have had excellent results in a large series of cases of small indirect hernia. It is less important that the lateral suture include fibers of the inguinal ligament than that it be of sufficient depth to include the lateral crus thus truly closing the ring.

Subsequent to suture of the transversalis fascia beneath the cord the role of the overlying internal oblique muscle in strengthening the repair has received attention from all proponents of internal ring closure from the days of Marey and Ferguson. Impressed by this action of the muscle MacGregor<sup>8</sup> used the term internal phincter and devised a technique of suturing through the transversalis fascia with a recurrence rate of 18 percent in 111 patients followed. There is little doubt that placing the ring as high as possible beneath the internal oblique through elongation of the inguinal floor helps considerably to protect this vulnerable area in the inguinal canal. During contraction the internal oblique further occludes the opening and its overlying muscle bundle becomes a real barrier to intra-abdominal pressure.

The importance of closure of the internal ring is more striking when one considers recurrence following hernia repair. In 1911 Levy Wren and Friedman<sup>9</sup> reviewed 1125 cases of recurrent hernia reported in the surgical literature up to that time and found that an

## INDIRECT INGUINAL HERNIA

average of 52.3 percent had recurred as indirect hernias. In a similar study, Zawacki and Thieme<sup>7</sup> reviewed 105 recurrent hernias for site and type of recurrence. Again, 52 percent had recurred at the internal ring. Watson<sup>22</sup> also has stated that 'after the Bassini operation indirect inguinal hernias most frequently recur through the opening left for the cord.' Levy and his colleagues<sup>23</sup> summarized a long felt need in concluding that repair of all inguinal hernias should include 'careful search for an indirect sac, high ligation of the sac when found, and snug closure of the internal ring about the cord, using the deepest tissues available for repair.'

Extending the classification of Ogilvie,<sup>4</sup> Harkins<sup>24</sup> has recently presented a logical and orderly approach to the consideration and teaching of hernia surgery outlining four types of repair each successive step incorporating the previous ones. Type 1 consists of simple ligation of the sac, type 2 adds suture of the transversalis fascia to give a snug closure of the internal ring, type 3 adds imbrication of the transversalis fascia over the direct space, and type 4 adds suture of the conjoint tendon to Cooper's ligament. For a number of years McVay and Chapp<sup>25</sup> have utilized only two basic operations: abdominal ring closure for small indirect hernia and Cooper's ligament repair for all others.

### Hernias in Childhood

The question of how much surgery is necessary in hernia repair in children has recently received much attention.<sup>26</sup> In pediatric centers a great deal of emphasis has been placed on simple ligation of the sac without disturbing the cord and consequently without demonstrating or disturbing the internal ring. The quoted recurrence rates have been extremely low in spite of the fact that those who have inspected the rings in infants have commented that at operation they are at times widely dilated by the pressure of a large sac. It has been postulated that subsequently the transversalis fascia tightens with the growth of the child much as small umbilical defects close spontaneously with growth. At what age this process stops and whether it takes place at all have yet to be demonstrated. Koontz<sup>27</sup> has stated however that 'in addition to ligating and excising the sac, the little hole in the abdominal wall ought to be closed.' Pott, Riker and Lewis<sup>28</sup> who reported a single recurrence in 200 repairs followed for several years, stated that no repair was used at the internal ring unless the sac was enormous or 'admits two fingers.' It would seem that the goal of inspecting the internal ring by dividing the cremasteric muscle attachment even in children, would assure a high

ligation of the sac—that is above the internal ring. Furthermore, as emphasized recently by McVay and Chapp, the one or two sutures necessary to close the ring would add little in time or complication for the insurance it would offer. A recurrence in a child, even at a much later date, might thus be prevented.

# REVIEW OF CASES

In the present report 88 consecutive operations for indirect hernias performed from August 1947 to February 1959 are reviewed. This includes 44 children and 44 adults (table 1). Recurrent hernias were included if they presented at the internal ring, thus appearing as indirect hernias. In all cases the sac was ligated above the internal ring and the cord elevated from the transversalis fascia floor at the internal ring. This necessitated dividing most of the cremaster muscle

Table 1. Type of operation and distribution of age of patients from August 1947 to February 1959.

Type of procedure	Age		
	<1 yr	1-16 yr	17-44 yr
Ligation of sac	1	3	0
Iliac fossa direct lig.	19	2	3
Ligation of internal ring and iliofemoral lig. to transversalis fascia	0	2	38
Total	0	7	41

at this level, reducing the cord to its basic elements of vas and vessels. After ligation and division of the sac, the peritoneal stump was allowed to retract freely. The cord was elevated and retracted medially and superiorly. The internal ring was then inspected for size. Whenever it was necessary to create a snug closure, the ring was closed beneath the external oblique, the transversalis fascia only with interrupted sutures of nonabsorbable material (fig. 1). In adult, in addition, the ductus deferens is evaluated with a finger within the peritoneal sac and additional imbrication sutures were placed in the transversalis fascia from the pubic tubercle to the internal

## INDIRECT INGUINAL HERNIA

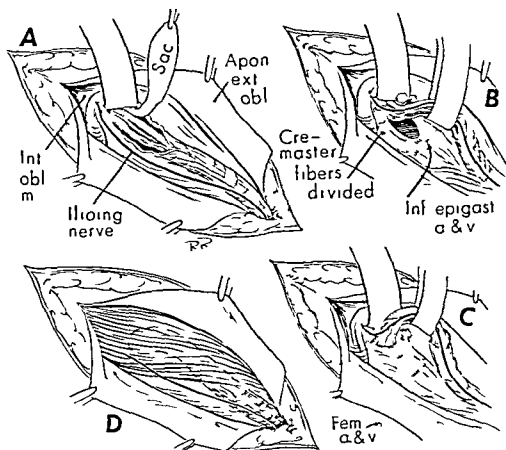


Figure 1 Successive steps in closure of internal ring (A) Longitudinal separation of the cremaster muscle and liberation of the sac (B) Ligation and excision of the sac. Cremaster fibers are divided only at the level of the internal ring to ensure clear visualization of the fascial margins (C) Closure of the ring. Fine interrupted sutures of silk or cotton are used. On completion no more than the tip of a fine hen's beak can be passed through (D) Final location of the internal ring beneath the overlying external oblique muscle

ring strengthening and reinforcing the original closure of the internal ring at this level

### Discussion of Recurrences

To date 82 of the 89 cases have been followed. The only recurrence was in a 10-year-old boy operated upon on 31 March 1958 for right-sided hernia of 1 month's duration. At the time of operation, the hernial sac was of small diameter and the internal ring appeared to measure less than 1 cm. This was one of the 4 patients on whom no repair of the internal ring was performed. Recurrence was first

noted 14 months later and repair was performed on 18 June 1959. After ligation of the new sac the internal ring was found larger than suspected requiring 4 sutures for closure beneath the cord.

Thus in those cases treated by closure of the internal ring there have been no early recurrences. The significance of this is admittedly limited since it is well recognized that a period of 10 to 20 years is necessary for determination of a true recurrence rate. Most surgeons, however, have found that about 10 percent of recurrences appear within the first year of operation and 25 percent within 6 months.

Of the 47 children in this report 3 presented as recurrent indirect hernias. A summary of the 3 follows.

# CASE REPORTS

CASE 1 MM #C998 A 4 y old boy had undergone repair of bilateral inguinal hernias 1 1/2 years ago at another hospital. The hernias on both sides had recurred gradually until 3 September 1958. A large ac with a single iliofemoral ligament identified about 1 cm from the internal ring. After high ligation of the internal ring the internal ring was repaired.

CASE 2 MM #0606 A 14 y old boy had undergone repair of right inguinal hernia. Recurrence with incarceration at 14 y. After ligation of the internal ring the internal ring was repaired. Repair performed January 1959. All internal hernias were repaired. The cord was not necessary to use the internal ring.

CASE 3 SF #69113 A 1 m th old boy had undergone repair of unilateral inguinal hernia. The right testis was found to be in the inguinal canal. Following repair of the hernia the internal ring was repaired. 13 September 1958. A mod atelized sac with internal hernia found. There were no adhesions to the right internal ring. After ligation of the internal ring three sutures were equidistantly placed along the internal ring.

# SUMMARY

The method of handling indirect inguinal hernias are discussed with emphasis on the necessity for inspecting and closing the internal ring after high ligation of the sac. A series of 88 consecutive operations for indirect hernia is reviewed. Among the 82 patients who have been followed for 18 months the only recurrence has been in a child one of 4 patients in whom the internal ring was not closed.

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## HYSTERICAL ABDOMINAL BLOATING

hospital the quickest way to make the correct diagnosis is to administer an anesthetic and note if the abdominal girth is suddenly lessened. Soon after his chloroform discovery, Simpson<sup>5</sup> used this test for spurious pregnancy. "In one very marked case in the hospital, he (Simpson) had passed a tube per anum, its nozzle being kept under water, but not a bubble of air escaped." In 1958, we used thiopental sodium, omitting the rectal tube but with all bystanders attentively listening and watching.

### CASE REPORTS

**CASE 1** A 37 year old woman complaining of intermittent abdominal swelling was referred to the Truesdale Hospital by Dr. William Serbst.

Three and one-half years before she had sudden enlargement of the abdomen which subsided spontaneously after 2 or 3 days without medication. This condition recurred frequently until January 1958 when the episodes occurred twice in 1 month. By 15 April 1958 the condition had become almost constant and was accompanied by epigastric pain and nausea. The patient's appetite was good. There was no vomiting. Bowel movements were normal. There were no urinary symptoms, no loss of weight and menstrual periods had always been normal.

Physical examination showed a well-developed, well-nourished and healthy appearing woman. The positive findings were limited to the abdomen which was tense without shifting dullness or masses and with normal peristalsis. There was minimal epigastric tenderness. Rectal examination findings were normal. Vaginal examination revealed a relaxed introitus, a normal cervix and a small anteverted uterus. All roentgenograms were normal. These examinations included abdominal films erect and supine when the patient was distended, cholecystograms, gastrointestinal series, barium enema, intravenous pyelograms, and roentgenograms of the chest. All laboratory studies including examination for urinary porphyrins were normal.

The following consultation note was written by Dr. Everett Rado.

The history reveals an interesting sequence of events which appear to be causally related, beginning with a tubal ligation performed 7 years ago. This was urged on the patient because of recurrent phlebitis with two previous pregnancies. She reluctantly consented in spite of her religious beliefs because of close rapport with her physician. For the week prior to surgery he cried constantly. Afterward she had strong feelings of guilt and of having committed a sin. Although she was a staunch Catholic she was afraid to go to confession. Her family finally prevailed upon her and 6 years ago 2 years after the operation he went to confession. Even though he had confessed and repented sincerely and persistently she has been unable to give up these guilt feelings.

Since the operation he has suffered from a state of frigidity having neither satisfaction from nor interest in sexual relations. This seems to be related to other facets of the problem in two ways. 1. If she enjoyed sexual

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Chief division of general practice Truesdale Hospital Fall River Mass



## HYSTERICAL ABDOMINAL BLOATING

The laboratory studies revealed a normal blood cell count and urinalysis. The urine was negative for bile and urobilinogen. Six urine specimens were negative for porphyrins and porphobilinogen. Electrolytes were normal. All liver function studies as well as basal metabolism rate, protein bound iodine, fasting blood sugar and heterophil antibody test were negative. A roentgenogram of the chest revealed normal findings and a flat plate of the abdomen was negative and showed no abnormal amount of gas when the patient was distended. Upper and lower gastrointestinal series were normal.

Multiple abdominal paracenteses yielded no fluid. Sigmoidoscopy was negative. Exploratory laparotomy revealed a large amount of fat subcutaneously and in the omentum. A normal Meckel's diverticulum and appendix were removed. An open biopsy of the liver revealed fatty metamorphosis. Postoperatively during an episode of distention the patient had a wound disruption which was repaired and he made an uneventful recovery.

Inasmuch as the patient continued to complain of distention he was given 300 mg of thiopental sodium intravenously. Complete relaxation of his abdomen resulted; the circumference of his abdomen diminished by two inches and his lordosis disappeared. The same effect but to a lesser degree resulted after the injection of mercurials and placebo.

With superficial psychotherapy the abdominal distention has markedly diminished and the patient has returned to active duty.

**CASE 3** A 41-year-old woman had been seen for numerous complaints, including abdominal back and chest pains in the outpatient clinic of the US Naval Hospital, Newport, Rhode Island. On two occasions she presented as an acute anxiety state. One year prior to admission and curettage of the uterus had been normal. For the past 1½ years she had had intermittent bloating of the abdomen lasting a few days every month. At times this bloating was related to menstrual periods but more commonly not. There was no passage of flatus when the abdomen distended. She had no food intolerance. She often vomited on arising. She had been unsuccessfully treated for syphilis. The patient had a 23-year-old daughter by her first husband who was killed at Pearl Harbor. She remarried in 1942 and had tried to have another child. She adopted one of her daughter's three children 3 years ago. The bloating of the past 2 years had coincided with a desperate attempt to become pregnant.

The only positive findings on physical examination was a distended abdomen. A complete blood cell count, sedimentation rate, urinalysis and Kahn test were negative. Roentgenograms of the chest, upper and lower gastrointestinal series and gallbladder series were all normal. The abdominal flat plate when the patient's abdomen was distended revealed no abnormal gaseous pattern. The patient was thought to have hysterical abdominal distention without gas. Her bloating has become much milder and less frequent as a result of entering in light into her problem.

## SUMMARY

Hysterical abdominal bloating not due to gas is the result of an involuntary protuberance of the abdominal muscles and arching of the back. A careful history will usually elicit an emotional basis. Most of the patients are women between the ages of 30 and 50 years.

They often have had multiple abdominal operations. In these patients there is a normal menstrual cycle. There is no passage of gas by mouth or rectum to account for the sudden deflation that can be brought about by heavy sedation or anesthesia. Three cases of hysterical abdominal bloating without gas have been presented in the hope that the cause of the condition will be recognized more frequently. The diagnosis can be made if one is aware of this entity and organic pathology is excluded.

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## OR OLFTL VERSION OF BEDSIDE MANNER

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# Clinicopathologic Conference

U S Naval Hospital  
Philadelphia, Pennsylvania

A 63 YEAR OLD WHITE MALE VETERAN was admitted to this hospital on 25 July 1957 with symptoms of weakness of the right side confusion and inability to speak. The onset of these difficulties had occurred suddenly on 14 July 1957 and he had been treated at another medical facility for approximately 1 week and sent home improved. Admission to this activity 3 days later had been prompted by a recurrence of symptoms. During the 24 hours prior to admission he complained of severe headache with repeated forceful vomiting and became irritable restless and subsequently drowsy. The vomitus was described as dark brown apparently free of blood. He also developed continuous hiccup.

The past history obtained from the patient's wife revealed that he had retired as a bricklayer and that during the past several years he had worked only at gardening as a hobby. He had enjoyed good health except for chronic complaint of abdominal pains and biparietal headache during the past 8 years. The abdominal pain was present morning and evening and relieved by bowel movement. The patient's wife could not furnish more specific information in regard to the headaches. Details of the family history were considered not significant.

## Physical Examination

The patient was an elderly well nourished white man who did not appear chronically ill. The blood pressure was 140/80 mm Hg pulse 64 per minute and regular respiratory rate 16 per minute. He had continuous hiccup. Auscultation of the precordium revealed a midsystolic click maximal at the pulmonic area which disappeared on full inspiration. A relaxed left inguinal ring was evident without any hernial mass. Neurologic examination revealed a mental state

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From the laboratory service U S Naval Hospital Philadelphia 1a. Capt Bruce H Smith Jr MC USN chief. Capt Charles L Ferguson MC USN for neurological officer was succeeded by Capt Edward T Knowles MC USN on 10 September 1959.

characterized by drowsiness with restlessness and irritability when disturbed. He was aphasic with garbled speech. Slight nuchal rigidity was present. The optic fundi were normal. A right hemiparesis including a central facial palsy and involving the upper and lower extremities about equally was present. Right hemiplegia was noted. Gross confrontation studies of the visual fields suggested a right homonymous defect. Because of the patient's mental state and aphasia, no attempt was made to substantiate this latter finding by perimetry and tangent field study. The deep tendon reflexes were equally hyperactive in the right upper and lower extremities and an equivocal extensor plantar reflex was elicited on that side. The abdominal and cremasteric reflexes were absent on the right.

### Laboratory Studies

Routine laboratory studies including complete blood cell count, urinalysis, blood sugar, blood urea nitrogen, and Venereal Disease Research Laboratory (VDRL) serologic test were negative or within normal limits. After fundoscopic examination revealed no evidence of papilledema, lumbar puncture indicated an initial pressure of 330 mm of water. Examination of the spinal fluid showed 2 cells (lymphocytes) per cu mm, sugar 63.4 mg per 100 ml, chloride 114.5 mEq per l, protein 5.0 grams per 100 ml.

### Course in Hospital

It became evident with observation of the patient's clinical course that the initial mental state and neurologic deficits were characterized by progressive deterioration. Roentgenogram of the chest (fig. 1) disclosed a minimal amount of strandlike increased density in the right base just behind the right hemidiaphragm. There was a slight shift of the heart at its maximum to the right. A definite conclusion could not be reached immediately as the findings could represent either an inflammatory process or an underlying bronchogenic malignancy. Examination of fluorograms (fig. 2) revealed a constricting lesion in the distal portion of the right lower lobe bronchus below the level of exit of the middle lobe bronchus. There was a soft tissue density which appeared to protrude into the bronchus below the exit of the upper lobe bronchus. These findings were interpreted as highly suggestive of a malignancy in this area. Skull roentgenograms were normal. A left arteriogram (figs. 3 and 4) showed good filling of the anterior cerebral and middle cerebral vessels. The anterior cerebral artery was displaced to the right in its anterior portion, believed to be due to a frontoparietal mass.



## CLINICOPATHOLOGIC CONFERENCE

On the ninth hospital day a left craniotomy was performed. Following exploration by means of repeated passes with a ventricular needle through the posterior frontal temporal and parietal region, a biopsy specimen was obtained from deep within the posterior frontal area where increased resistance within the white matter had been encountered. Microscopic examination of this biopsy tissue revealed gliosis and satellitosis.

Within the immediate postoperative period and for several weeks following an improvement was observed in the patient's mental alertness but no significant improvement in the aphasia or hemiparesis could be discerned. During this period a subtemporal decompression performed at the time of surgery remained soft. The terminal few weeks of hospitalization were characterized by progressive mental



Fig. 1. Roentgenogram of the chest showing location of the right hemidiaphragm and increased density in the right base.

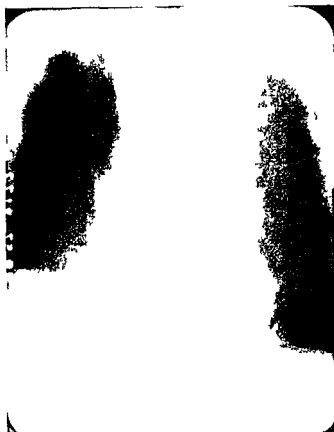


Figure 11. Frontal and lateral chest X-ray films showing bilateral pulmonary infiltrates.

deterioration with evidence of increased intracranial pressure. The patient died 3 months following onset of symptoms.

## DISCUSSION

Dr. Whitmore: The site of the lesion or lesions seems obvious and it appears that the more accurate delineation of their true nature would pose the main problem in this case.

The history is that of a 63-year-old white man whose original presenting signs and symptoms were apparently attributed to a fairly

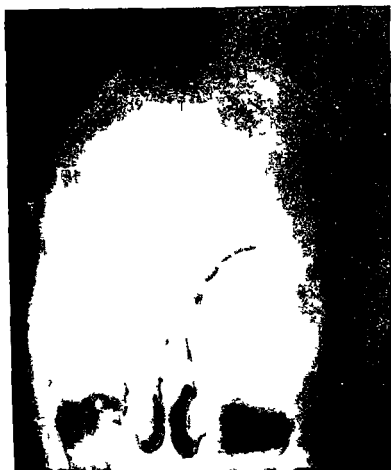


Figure 3. A. Angiogram showing shift of left anterior cerebral vessels to the right.

typical cerebrovascular accident involving the left middle cerebral artery. Approximately 2 weeks later he was beset with a recurrence of these signs and symptoms precipitating his admission to this hospital. Noteworthy details of his history as obtained on this admission included severe headache, forceful vomiting, and continuous hiccup. The physical findings were compatible with an intracranial lesion involving the dominant left cerebral hemisphere. The cerebrospinal fluid pressure and the findings on the left carotid arteriograms prompted craniotomy with the hope of finding a surgically benign intracranial lesion. The findings at craniotomy led to the assumption that the lesion was inoperable.

Posteroanterior chest film and planigrams were interpreted as revealing a constricting lesion in the distal portion of the right main stem bronchus and were considered highly suggestive of malignancy in this area. I assume that no attempt was made to perform broncho-

copy on this patient for a biopsy diagnosis because of his poor general status. It is unfortunate that this could not have been done for a tissue diagnosis of bronchogenic carcinoma of the lung would provide a reasonable primary site. Cancer of the lung produces cerebral metastases in a remarkably high percentage of cases the reported incidence ranging from 20 to 40 percent.<sup>1</sup> Most disconcerting clinically are those not uncommon cases in which the chief complaint and presenting symptoms are due to the cerebral metastases. These metastases are carried via the arterial blood stream as small tumor emboli which may or may not—depending upon their size at the time of migration—cause vascular symptoms. The symptoms may vary from a psychosis to a hemiparesis of sudden onset and are unfortunately not peculiar to metastatic lesions as distinguished from primary tumors or from vascular disease of the brain. The mode of metastasis, the usual age group of these patients and the well documented statistical advantages of routine chest roentgenograms indicate the importance of considering cerebral metastases in the differential diagnosis of all apparent cerebrovascular accidents as well as in the



Fig. 4. Anteroposterior view.

## CLINICOPATHOLOGIC CONFERENCE

preoperative evaluation of cerebral tumors. The possibility of a metastatic brain lesion from a quiescent primary, especially one arising from the lung, breast or kidney, must always be considered. Craniotomy in this instance, I presume, was performed to exclude a second and entirely unrelated intracranial lesion.

Nevertheless, in the absence of a proved bronchogenic lesion, due consideration must be given to a differential diagnosis of intracranial mass lesions. I would classify these according to a vascular, traumatic, infectious or neoplastic etiology.

The normal skull roentgenogram and normal cerebrospinal fluid findings, with the exception of increased intracranial pressure, would mitigate to various degrees against the presence of either thrombosis, hemorrhage or embolism. On the other hand, there are those few instances of intracranial vascular lesions whose presence offers no clue in the cerebrospinal fluid. I believe, however, that compared with other possible etiologic agents, the evidence for any vascular lesion, except subdural hematoma or intracerebral hemorrhage with clot formation, is insufficient. The history, physical findings and laboratory results are compatible with the presence of either of these latter lesions. I would delete intracerebral hemorrhage from consideration in this instance, not because of incompatibility, but because of the operative findings and the lack of the usual cerebrospinal fluid findings.

There was no history of head injury and no evidence of trauma on physical examination or skull x-rays; there is therefore no reason to implicate a traumatic lesion other than subdural hematoma. However, it would seem that at craniotomy, subdural hematoma was exonerated as a cause. The vagaries of subdural hematoma as regards position and the correlation of signs and symptoms might still allow for some suspicion of its presence, but I do not believe that one could expect more evidence against its presence than the findings at craniotomy in this case.

In regard to infection as the cause of hemiparesis, intracranial infectious lesions are most frequently the result of thrombosis of inflamed vessels and are more common in chronic and subacute infections such as tuberculosis and syphilis.<sup>2</sup> Normal cerebrospinal fluid studies, the absence of a history indicating these chronic infections, a negative blood serologic examination and the absence of a febrile course would all lend little support to an etiologic agent from this group.

Tumors, neoplastic primary or secondary metastatic lesions and brain abscess would seem plausible causes of increased intracranial pressure, recurrent focal neurologic findings and the abnormal left carotid arteriogram in this patient. The classic signs of increased intracranial pressure, namely vomiting and severe headache, were

present and were corroborated by the cerebrospinal fluid pressure of 330 mm of water. In addition attention may be directed to the presence of continuous hiccup which in this particular case could be postulated as due to intrathoracic or intracranial involvement or irritation. Tumors in the vicinity of the fourth ventricle have been known to cause hiccup and might also account for the presence of nausea and vomiting on the basis of irritation of the vagus nerve. The absence of papilledema the most characteristic single sign of brain tumor does not rule this diagnosis out and papilledema may be absent in approximately one quarter to one half of cases. The findings on arteriography and at operation would seem to offer substantial evidence in this patient of an intracranial tumor.

The diagnosis of brain abscess may be entertained whenever there is a focal brain lesion and a logical source of sepsis usually pulmonary or cranial. An afebrile course as implied in this instance would remain consonant with a diagnosis of brain abscess in that fever is not usually present unless the focus is active. In addition whether the pulmonary findings represent malignancy or not it could be surmised that there was some degree of pulmonary infection superimposed upon a malignancy at one time or another thereby providing a source of sepsis for infective embolization.

This approach narrows the differential to include metastatic tumor to brain primary brain tumor and brain abscess. In the presence of the pulmonary findings as described I feel the most logical diagnosis in this age group would be a primary bronchogenic carcinoma with metastases to the brain.

Before closing I would like to comment on the complaint of abdominal pain which seems unrelated and most readily accounted for on the basis of a recently relaxed left inguinal ring. Brain tumor may be associated with abdominal pain the mechanism or causal relationship for which I do not know and have not found described.

DR BRANNON: From a clinical standpoint we were presented with an elderly person whose history had related a sudden onset of speech deficit nausea vomiting and a weakness of the right side. From that time there had evidently been a progression of symptoms with weakness of the right side a prominent feature. This man had retired some years ago and had confined himself almost exclusively to gardening. On one occasion following discharge from his initial hospitalization and a few days prior to readmission the wife had noted that he continued to walk in the garden on his hands and knees yet she claimed he was unable to stand at the time because of the weakness

## CLINICOPATHOLOGIC CONFERENCE

in the right leg. This was considered important inasmuch as the neurologic deficit was not inconsistent with a cerebrovascular accident as suggested by the history.

We entertained a clinical impression at the time of admission that he had initially suffered a cerebral thrombosis and that because of his persistent activity after onset of the hemiparesis he had possibly incurred a head injury with subsequent subdural hemorrhage. A left cerebral arteriogram was performed in the hope of demonstrating such a lesion. As noted previously, this failed to be the case and a rather marked shift of the left cerebral vascular pattern consistent with an intracerebral lesion was noted. No tumor stain was noted. The pattern of shift in the major vessels was consistent with cerebral edema which is not uncommonly associated with metastasis. It was also consistent with multiple small metastases. In view of the findings noted on the chest film, a diagnosis of bronchogenic carcinoma with metastasis to the left cerebral hemisphere and associated cerebral edema was considered.

It was decided to turn a generous bone flap to expose the left posterior frontal and temporal lobe in the hope of revealing an accessible metastatic lesion that could be removed without undue damage to the dominant hemisphere. The exposure failed to reveal such a lesion. A small biopsy specimen was taken from the posterior frontal region where a suspicion of increased density had been encountered by passing a ventricular needle through that area. Exploration posterior or deep to this area would have left the patient with a severe neurologic deficit. A moderate sized subtemporal decompression was resorted to. The patient survived for 2 months following surgery with total aphasia, progressive mental deterioration to a state of coma and finally respiratory failure. During this period we continued to consider the primary diagnosis one of bronchogenic carcinoma with metastasis to the brain.

DR WHITMORE'S DIAGNOSIS

Bronchogenic carcinoma metastatic to brain

DR BRANNON'S DIAGNOSIS

Postoperatively Metastatic carcinoma brain inoperable

## PATHOLOGIC FINDINGS

DR WOOD. At autopsy, meticulous search of the bronchial tree failed to reveal the presence of any intrinsic mucosal lesion. There were several enlarged hilar and mediastinal lymph nodes which in

It is helpful to Wood Jr. M.D. resident pathology service

the region of the right main stem bronchus compressed the bronchial lumen at the hilus. The lymph nodes contained large quantities of anthracotic pigment and there were numerous focal depositions of anthracotic pigment throughout the pulmonary parenchyma. There was no evidence of primary or metastatic neoplasm. There were plaquelike adhesions between the visceral and parietal pleura.

On step section of the brain a primary neoplasm measuring 2 cm in diameter was found in the left occipital lobe. The lesion was confined above the tentorium cerebelli and was located in the white matter of the posterior portion of the occipital lobe. It compressed the overlying cortex circumferentially in a symmetrical manner. The adjacent white matter for a distance of 3 cm proximally was cystic and replaced by hemorrhagic brownish tissue. The cortex in these areas was flat and narrowed. The tumor was sharply circumscribed and composed of firm heterogeneous tissue with gross areas of hemorrhage and necrosis. The main tumor tissue was yellow white in color. The white matter in the involved side was markedly thickened and edematous measuring 4 cm in the frontal lobe as compared with 1.5 cm at the same site on the right side. This accounts for the clinical finding of shift of the anterior cerebral vessels to the right which contributed heavily to mislocating the tumor in an area of edema, gliosis and satellitosis. Microscopically (figs 5 and 6) the tumor is composed of whorls of pleomorphic cells arranged for the most part around blood vessels. There is associated hemorrhage, necrosis and endothelial proliferation. Moderate numbers of bizarre mitotic division figures are seen. Special stains show these cells to be fibroblasts of varying stages and for that reason the tumor has been classified as a primary fibrosarcoma of the brain.

Sarcomas of the central nervous system are not common and few series have been reported. Bennett found 5 sarcomas (1.1 percent) in his series of 446 intracranial neoplasms at the Armed Forces Institute of Pathology. Abbott and Kernohan had 11 intracranial sarcomas available for study. They divided these 11 cases into 3 types: (1) fibrosarcoma (3 cases), (2) perivascular sarcoma (6 cases) and (3) sarcoma of unknown type (2 cases). They believed that these tumors could take origin from any connective tissue within the brain, the adventitia of blood vessels or the pia mater deep in the sulci. Sarcomas of the brain usually are dense and gray with regions of necrosis. They are invariably sharply circumscribed from the surrounding brain. They seem to be encapsulated because they are commonly surrounded by a zone of necrotic brain tissue but there is in reality no capsule. Edema of the neighboring brain tissue is common and usually pronounced.



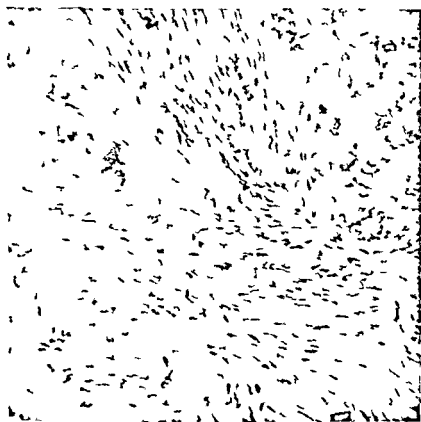


Figure 3. Representative section of primary bronchial tumor showing the wheel-like configuration and absence of a cytotoxic cell (x 42)

Microscopic examination of the lungs showed moderate congestion and edema focal lipoid pneumonia and numerous clumps of dumb bell like dark brown bodies with segmented body and central fiber (fig 7) considered classic asbestosis bodies. Consultation with the Armed Forces Institute of Pathology<sup>6</sup> confirmed this impression. Similar bodies were found in the hyperplastic hilar lymph nodes.

Asbestosis is a disease resulting from the inhalation of long fibers of asbestos. It is more often acquired by workers in the processing plants than in the asbestos mine where only the crude asbestos is handled. The fiber consists essentially of magnesium silicate. Because of its relatively large size it does not enter the alveolar sacs but ordinarily lodges in the respiratory bronchioles where the initial inflammatory reaction occurs. The resulting fibrosis is diffuse rarely nodular and involves the basal portions of the lungs rather than the middle portions as in the case of silica. The pleura is involved early and becomes greatly thickened and rigid usually with obliteration of much of the pleural space by fibrous adhesions. Asbestosis bodies are pathogno-

monic of the disease and are thought to be formed by the deposition of proteins and iron salts on the surfaces of the asbestos fibers. These bodies are segmented, fungus-like masses with bulbous ends and are yellow to orange brown by transmitted light. They are present in the air space, surrounded by macrophages and sometimes by multinuclear giant cells, or are imbedded in the dense masses of fibrous tissue where all alveolar structure is obliterated. Occasionally the bodies can be found in the sputum, making possible a specific diagnosis. Lymph channels are not directly invaded in asbestosis because the particles are generally too large to be phagocytosed and carried in the macrophages to lymph nodes; the involvement of bronchopulmonary nodes is therefore comparatively slight. Obliteration of lymph channels and blood vessels is brought about within involved masses of pulmonary parenchyma and pleura by the same mechanism which operates in any chronic inflammatory process.<sup>7</sup> Since this patient had been a bricklayer and since some kinds of fire brick have asbestos in them, perhaps this was the source of his pulmonary lesion.

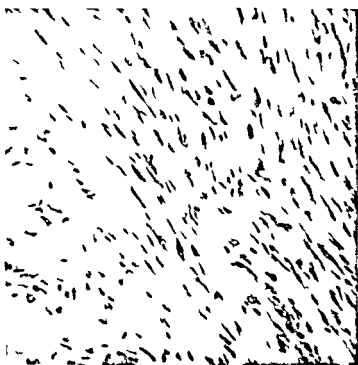


Figure 6. Bronchopulmonary tissue with asbestos bodies (130x magnification).  
 f fil bl t tu w tl n l tl l p ol f t n n l  
 occa n l t t fig ( 130)



Figure 7 Characteristic appearance of the asbestos bodies in the lung (x 459)

#### **PATHOLOGIC DIAGNOSES**

- 1 Primary fibrosarcoma left occipital lobe
- 2 Asbestosis with involvement of hilar lymph nodes

DR SMITH Dr Brannon could you now correlate the neurologic and autopsy findings?

DR BRANNON One comment Dr Wood made was in reference to the marked edema associated with this tumor. It is apparent we had miscalculated the location of this tumor both from a clinical evaluation of the patient's neurologic deficit and from interpretation of the arteriogram. The patient's hemiparesis sensory deficit and aphasia as well as the arteriogram pattern can be ascribed to a space occupying lesion in the frontoparietal area—in this case edema and cellular reaction rather than the tumor itself. This is a point we have to bear in mind in localizing a neurologic lesion. In a case such as this with a tumor mass located well posterior in the occipital lobe the carotid arteriogram failed to reveal evidence to correct the localization.

DR SMITH Dr Matthews would you comment on the radiographic findings in this case and the usual findings in asbestosis?

DR MATHEWS One of the most striking features of asbestosis is the total absence of radiographic abnormality even when the clinical symptoms are obvious. The patient may be severely dyspneic and asbestosis bodies may easily be found in the patient's sputum yet his chest radiograph is completely normal.

In asbestosis the earliest roentgenographic finding is usually the presence of fine strands of fibrosis at the bases. The pulmonary lesions are different from those seen in silicosis in which pulmonary nodularity is a prominent feature. Conglomerate shadows such as occur with silicosis are usually not found in asbestosis.<sup>8</sup>

The finding of a constricting lesion of the right lower lobe bronchus was more apparent than real as was proved at autopsy. The associated soft tissue density must have represented a hyperplastic lymph node.

DR SMITH Dr Wood, do you have any final comments?

DR WOOD I believe that the gross and microscopic findings of asbestosis with hyperplastic hilar and mediastinal lymph node correlate well with the radiographic findings. The elevation of the right hemidiaphragm was due to phrenic nerve paralysis on a central basis from increased intracranial pressure. The cause of death was felt to be respiratory failure due to a combination of increased intracranial pressure, respiratory depression and a focal lipid pneumonia which may have been a terminal event.

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# Case Reports

## Eosinophilic Granuloma of the Rib

GEORGE C. GODFREY, M.D.

JOSEPH M. MILLER, M.D.

MILTON GINSBURG, M.D.

EOSINOPHILIC GRANULOMA was apparently first described in 1929 by Finzi,<sup>1</sup> with Fraser,<sup>2</sup> in 1935, giving a more complete description of the entity. Lichtenstein and Jaffe<sup>3,4</sup> named the lesion in 1940. Although the cause is unknown, the disease appears to be closely associated with Letterer-Siwe disease and Hand-Schüller-Christian disease. These three diseases may be different stages of the same condition.<sup>4,5</sup> If this is so, Letterer-Siwe disease, the most acute generally fatal form, occurs in young children. Hand-Schüller-Christian disease, a severe and often fatal form in older children and eosinophilic granuloma, the benign form in young adults. Biopsies from various areas of the same lesion, however, have shown characteristics of each of the forms of the disease.<sup>6</sup> Fisher reported a change from Letterer-Siwe disease to Hand-Schüller-Christian disease in one patient and Engelbreth-Holm-Teilmann and Christensen<sup>11</sup> observed a change from eosinophilic granuloma to Hand-Schüller-Christian disease in one patient.

Men are affected with eosinophilic granuloma more often than women. The disease usually occurs in children and young adults although Adams and Kraus<sup>7</sup> reported an instance in a 73-year-old woman.

Involvement of other sites such as the lung,<sup>8,9</sup> kidney,<sup>12</sup> gas-tric ganglion,<sup>10</sup> spleen,<sup>4</sup> stomach and small intestine<sup>13</sup> and skin<sup>14</sup> has been reported. Reports of 15 patients with solitary lesions of the rib<sup>5</sup> and 10 patients with involvement of bone and lung<sup>5,12,13</sup> have been found. One of these patients had an associated spontaneous bilateral pneumothorax.<sup>12</sup>

Serial roentgenograms may show a rapidly growing solitary lesion in a rib. Frequently a mass may be felt. Occasionally, the lesion is asymptomatic.

From Veterans Administration Hospital, Fort Howard, Maryland.

If the lungs are involved a diffuse soft hazy and occasionally nodular infiltration is seen in the parenchyma during the early stages of the disease. If progression occurs parenchymal fibrosis appears. Weinstein, Francis, and Spiroffman reported the association of eosinophilic granuloma of multiple bones and infiltration of the lung. Biopsy of tissue from eosinophilic granulomatous lesions of the lung has been performed.

Eosinophilic granuloma may occur as a single lesion or as multiple lesions in bone or soft tissues. Where bony disease is present the destructive lesions closely resemble neoplastic diseases and inflammatory conditions. A solitary lesion may simulate a bone cyst, a giant cell tumor, a Ewing's tumor, a solitary myeloma, an osteogenic sarcoma or an osteomyelitis. Multiple lesions may present the same clinical signs and roentgenographic findings as multiple myeloma, metastatic tumor, osteitis fibrosa cystica, Letterer-Siwe disease or Hand-Schüller-Christian disease.

Multiple diagnostic studies are necessary to establish the nature of a lytic lesion of a rib. A complete blood count is necessary. The values for calcium, phosphorus, acid phosphatase, alkaline phosphatase, total protein, albumin and globulin of the blood plasma should be determined. The albumin-globulin ratio should be ascertained. A serologic test for syphilis should be done. A urinalysis should be performed and the urine should be examined for Bence-Jones protein. Roentgenograms of the chest, skull, vertebrae, ribs, pelvis, humeri and femurs should be made. A gastrointestinal series, a barium enema and an intravenous pyelogram may be necessary.

The treatment for a solitary lesion in a rib is excision. Inasmuch as the definite diagnosis usually can be made only after histologic study of tissue obtained from the lesion, a block excision of the overlying muscle, the rib and the underlying pleura should be performed. The pleural surface of the rib often is eroded and this additional factor favors such an operation.

Eosinophilic granuloma is sensitive to treatment with roentgen rays. Such therapy should not be given, however, until a piece of the tumor has been obtained for biopsy. Infiltration of the lung has regressed following this type of treatment when given early in the course of the disease. Improvement of parenchymal fibrosis of the lung following such treatment has not been observed roentgenographically.

# CASE REPORTS

CASE 1. A 36-year-old male admitted to the medical service of this hospital on July 1, 1948, complaining of pain in the left wrist. The history and rate

## CASE REPORTS—EOSINOPHILIC GRANULOMA OF RIB

shortness of breath of about 4 days duration and a nonproductive cough of 1 day duration. The pain did not radiate.

The patient was well developed but poorly nourished. The physical signs of a left pneumothorax were present.

On 20 April the hemoglobin was 92 grams per 100 ml. The white blood cell count was 9100 per cu mm with a differential count of 1 percent neutrophil, 26 percent lymphocytes, 2 percent eosinophils, and 1 percent basophils. On 6 April the white blood cell count was 7400 per cu mm of which 70 percent were neutrophils, 2 percent lymphocytes, and 8 percent eosinophils. Serum calcium, phosphorus, acid phosphatase, and alkaline phosphatase were within normal limits. Total serum protein was 7.3 grams (albumin 3.46 grams, globulin

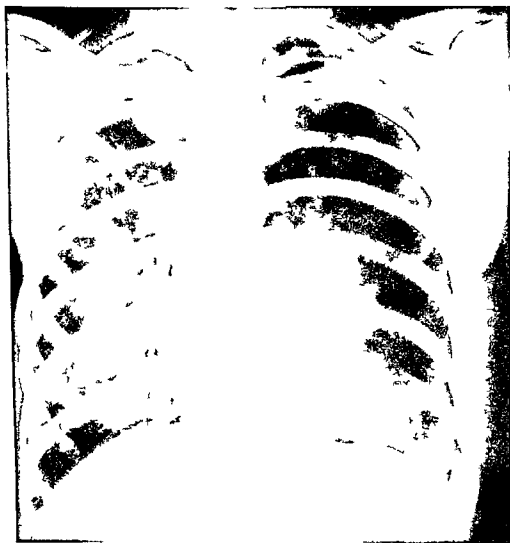


Figure 1 (case 1). Roentgenogram on 19 April 1948 showing the traction pneumothorax tilted slightly to the right.

# U S ARMED FORCES MEDICAL JOURNAL

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## CASE REPORTS—EOSINOPHILIC GRANULOMA OF RIB

A soft pale grayish pink tissue replaced the bone occupied almost the entire marrow cavity and nearly completely eroded the cortex on the pleural surface of the rib. Microscopic examination showed the tumor to be an eosinophilic granuloma.

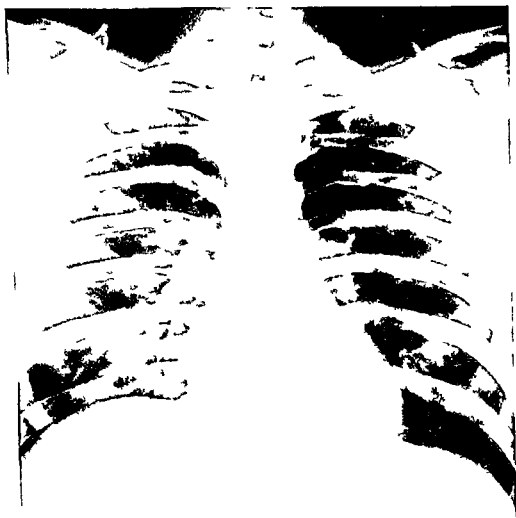


Figure 2 (case 2) R chest roentgen on 27 May 1953 showing an oval and radiolucent area at the junction of the ninth and middle third of the postero-posterior of the ninth rib.

The patient was discharged from the hospital on 15 June. He returned for follow-up examination on 30 July 1953, 30 January 1954, 26 August 1954 and

FEBRUARY 1960



# CASE REPORTS—EOSINOPHILIC GRANULOMA OF RIB

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# Sting by a Venomous Lionfish

PAUL R. SAUNDER PH.D.

LIEUTENANT COLONEL SOLOMON E. LIFTON USAF MC

A NUMBER OF tropical marine fishes are known to be capable of inflicting serious wounds by means of their venomous spines. For example stings by the stonefishes *Synanceja horrida* (Linnaeus) and *Synanceja verrucosa* Bloch and Schneider cause excruciating pain and marked swelling in addition systemic effects may be severe and death has occurred in a number of cases.<sup>1-5</sup> Another fish which has been responsible for painful wounds similar at least superficially to those produced by the stonefish is *Pterois volitans* (and other species of the same genus) a scorpionfish which occurs over wide areas of the tropical Pacific and Indian Oceans. This fish (commonly known as the lionfish, turkeyfish or zebrafish) is found in shallow water and is often encountered by skindivers (fig. 1). Although it is generally recognized that stings by the spines of this fish may have serious consequences, adequate case histories have been lacking. The present report describes a case in which serious local and systemic effects occurred.

## CASE REPORT

The victim was a 38-year-old man in good physical condition. He encountered the fish while skin-diving in the Pacific Islands. He was stung by the stonefish *Synanceja horrida* (Linnaeus) and *Synanceja verrucosa* Bloch and Schneider. The sting caused excruciating pain and marked swelling. In addition, systemic effects were severe and death occurred in a number of cases.<sup>1-5</sup> Another fish which has been responsible for painful wounds similar at least superficially to those produced by the stonefish is *Pterois volitans* (and other species of the same genus) a scorpionfish which occurs over wide areas of the tropical Pacific and Indian Oceans. This fish (commonly known as the lionfish, turkeyfish or zebrafish) is found in shallow water and is often encountered by skindivers (fig. 1). Although it is generally recognized that stings by the spines of this fish may have serious consequences, adequate case histories have been lacking. The present report describes a case in which serious local and systemic effects occurred.

From Department of Medicine, University of California, Los Angeles, California. Received for publication, May 1, 1964.

## CASE REPORTS—STING BY VENOMOUS LIONFISH

repeated at intervals over a period of several hours in order to maintain blood pressure at the end of this period the patient was fully conscious and pulse rate and blood pressure had returned to normal



Figure 1 Specimen of *Pterois volitans* (Linnaeus) from Eniwetok Atoll, Marshall Islands (total length 24 cm). The venomous long dorsal spines (arrow) and the black markings on the body of the fish are apparent.

Subsequent treatment included the intravenous administration of 100 mg of ascorbic acid and the intramuscular administration of 100 mg of meperidine hydrochloride and 10 mg of diphenhydramine hydrochloride. An ice pack extending from the right hip to the right knee was applied. The pain had disappeared by the following morning and the patient was discharged from the hospital about 24 hours after the incident. The swelling of the fingers diminished only very slowly and a month had elapsed before they resumed normal size. The skin of both fingers eventually sloughed off. The victim has experienced no known adverse effects during the 6 years following the incident.

## COMMENT

The local effects (very severe pain swelling) seen in the case reported here are similar to those described previously. No reports of cardiovascular collapse have come to our attention, however. Recent studies on the pharmacologic actions in rabbits of the venom from the spines of *Pterois volitans* indicate that the primary effect of small doses is the production of hypotension with essentially no change in the electrocardiogram. Amounts of venom sufficient to lower the blood pressure to about one half will produce evidence of myocardial ischemia or injury (flattening or inversion of T wave or displacement of S-T segment) which is reversible if the animal recovers. Injection of fatal doses produces effects initially which are similar to those described above. A variety of additional electrocardiographic changes soon appear (e.g. extrasystoles bundle branch block ventricular tachycardia ventricular fibrillation). The respiration slows and finally ceases and the blood pressure continues to decrease. Initiation of artificial respiration in these rabbits immediately after respiratory arrest is ineffective in prolonging the life of the animal. Therapeutic measures directed toward the support of the circulation are suggested by these experiments and the immediate response to epinephrine in the case reported here is in accord with this view.

The local effects experienced by victims of stings by lionfishes and by stonefishes (e.g. excruciating pain marked swelling) appear to be essentially the same. Furthermore, effects of the two venoms upon the cardiovascular system of the rabbit are also almost indistinguishable. A further point of similarity is that the active substances in both cases are nondialyzable and apparently protein in nature. These facts suggest that the active substance or substances in these venoms are closely related and that similar therapeutic measures should be used in both cases.

## SUMMARY

A case of severe poisoning following a sting by dorsal spines of the tropical marine lionfish (*Pterois volitans*) is reported. The victim experienced severe local pain and swelling followed by cardiovascular collapse. Repeated administration of epinephrine was effective in restoring and maintaining blood pressure and heart rate. Local swelling persisted for a period of weeks after the sting but no permanent after effects were noted.

## CASE REPORTS—STING BY VENOMOUS LIONFISH

**ACKNOWLEDGMENT** The details of the case were obtained in the course of an investigation of the venoms of various marine fishes. This investigation was aided by a contract between the Office of Naval Research Department of the Navy and the University of Southern California NR 10-342. We wish to thank Dr C C Custer of Lanai City Hawaii for furnishing some of the details of the medical treatment in this case.

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### YES DOCTOR PERRY

There is an occupational hazard in the practice of medicine that if not guarded against can do the individual doctor the professor as a whole and society at large a great deal of harm. It is the temptation for doctors to think of themselves as individuals apart from the rank and file of humanity set apart by knowledge skill and power—and intellectual life. It is easy to see how the temptation arises. Patient asks questions. Doctors give the answers. Patient does what is told them to. Somehow we get to feel that we are entitled to an acquiescent doctor from the whole human race on any matter whatsoever. We fall in other words, into what the theologians call the sin of pride. We tend like the Pharisee to thank God we are not as other men are. —RALPH PERRY I Have My Mind—What No Mind *Medical* August 1959

## COMMENT

The local effects (very severe pain swelling) seen in the case reported here are similar to those described previously. No reports of cardiovascular collapse have come to our attention however. Recent studies on the pharmacologic actions in rabbits of the venom from the spines of *Pterois volitans* indicate that the primary effect of small doses is the production of hypotension with essentially no change in the electrocardiogram. Amounts of venom sufficient to lower the blood pressure to about one half will produce evidence of myocardial ischemia or injury (flattening or inversion of T wave or displacement of S-T segment) which is reversible if the animal recovers. Injection of fatal doses produces effects initially which are similar to those described above a variety of additional electrocardiographic changes soon appear (e.g. extrasystoles bundle branch block ventricular tachycardia ventricular fibrillation). The respiration slows and finally ceases and the blood pressure continues to decrease. Initiation of artificial respiration in these rabbits immediately after respiratory arrest is ineffective in prolonging the life of the animal. Therapeutic measures directed toward the support of the circulation are suggested by these experiments and the immediate response to epinephrine in the case reported here is in accord with this view.

The local effects experienced by victims of stings by lionfishes\* and by stonefishes (e.g. excruciating pain marked swelling) appear to be essentially the same. Furthermore, effects of the two venoms upon the cardiovascular system of the rabbit are also almost indistinguishable. A further point of similarity is that the active substances in both cases are nondialyzable and apparently protein in nature. These facts suggest that the active substance or substances in these venoms are closely related and that similar therapeutic measures should be used in both cases.

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## ORAL PATHOLOGY COURSE

A postgraduate short course on pathology of the oral regions for the general dentist and pathologist has been announced by the Armed Forces Institute of Pathology 14-18 March 1960. Consisting of lectures presentations of case histories and conferences the course will cover clinical and histopathologic features of inflammatory and neoplastic diseases of the lip tongue floor of mouth cheeks palate and oropharynx tumors of the odontogenic apparatus and cysts of the oral regions pathology of the pulp and periodontium normal embryogenesis of the teeth and jaw and anomalies of the teeth with respect to size shape and development and correlation of the oral manifestations of systemic disease with their histopathology with equal emphasis on the clinical histopathologic and roentgenographic features of oral disease.

### Official Decorations

The following awards were recently announced by the Departments of the Army Navy and Air Force

#### Distinguished Service Medal

Wilford H. Hall Maj Gen USAF MC

#### Legion of Merit

James M. Davis Col USAF MC  
Frederick J. Freese Jr Col USAF MC

#### Air Force Commendation Ribbon with Metallic Clasp

Leo A. Jaclowksi Comdr MSC USA  
James H. McKin Col MSC USA  
Byron G. McKibbin Col MC USA  
H. H. Kell Zepherus Lt Col MC USA

#### Navy Commendation Ribbon with Metal Pendant

Robert C. Bornmann Lt MC USNR

#### Air Force Commendation Medal

Samuel A. Terris Lt Col USAF DC

\*First oak leaf cluster



**AIR FORCE CHIEF NURSE** Lieutenant Colonel Dorothy N. Zeller USAF MC former deputy succeeded Colonel Frances I. Lay USAF MC as chief of the Air Force Nurse Corps on 8 January 1960. Colonel Lay has been named command nurse for the U.S. Air Force in Europe. W. Baden G. Smith A 1935 graduate of the Philadelphia General Hospital School of Nursing. Colonel Zeller has served continuously in duty for 23 years.

### Officers Certified By Specialty Boards

The Surgeon General of the Navy and Air Force have announced that the following regular Medical Corps and

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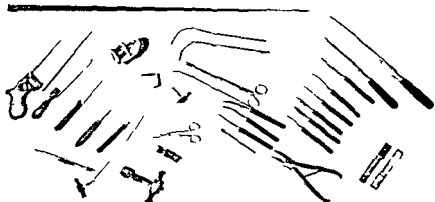
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## Progress Notes

Brigadier General Floyd L. Wegland MC USA executive director office for dependents medical care office of the Army surgeon general Rear Admiral Edward C. Kenney MC USN deputy and assistant chief of the Bureau of Medicine and Surgery and Colonel Aubrey L. Jennings USAF MC director of professional services office of the Air Force surgeon general represented the surgeons general of their respective services in the House of Delegates at the American Medical Association's clinical meeting in Dallas Texas 1-4 December 1959 Lieutenant Colonel

Edward C. Knoblock MSC USA chief of the department of chemistry at Walter Reed Army Institute of Research has been promoted to his present rank.

In imitation of civilian dental practitioners who use soft music in offices and operating rooms to soothe their patients the dental department of the Naval Air Station at Jacksonville Florida has installed 21 speakers in the department which provide a 20-minute flow of soft music from tapes followed by a 4 minute period of rest Captain Macy G. Martin DC USN is the senior dental officer at the station.

The new dental intern program at Fort Knox Kentucky for Army dental officers entering the service is under the direction of Colonel Henry B. Fitch DC USA Captain Robert A. Freyling MC USN US Naval Hospital Camp Pendleton California has been named executive officer and chief of orthopedics at the US Naval Hospital Corpus Christi Texas.

Colonel Adam J. Rapalik MC USA has been named as commanding officer of the Army Environmental Health Laboratory Army Chemical Center Edgewood Mary

land replacing Colonel Edward J. Dehne MC USA now preventive medicine officer Second Army Fort Meade Maryland Lieutenant Commander Virginia Lee Riley NC USN an accomplished artist who studied at the Boston Museum of Art recently exhibited a collection of her watercolors in Washington DC Her work was also exhibited at the 22d annual Metropolitan Art Exhibition at the Smithsonian Institution and at the Naval Medical Center Bethesda Maryland where she is now stationed during the 51st anniversary of the Navy Nurse Corps.

Captain Shakeeb Ede MC USN who succeeded Captain Russell H. Blood MC USN as executive officer will also serve as chief of surgery of the US Naval Hospital Great Lakes Illinois Captain Blood has been reassigned as Fourth Naval District medical officer Philadelphia.

Major John E. Ren MC USA is the new assistant chief of the dermatology service at Fitzsimons Army Hospital Denver Lieutenant John D. Culberson MC USNR of the US Naval Hospital Philadelphia has been appointed as an instructor in the department of pathology Woman's Medical College of Pennsylvania.

Colonel George F. Lull MC USA former chief of diagnostic radiology at Fitzsimons Army Hospital is now chief of radiology service at William Beaumont Army Hospital El Paso Texas Captain Gerald W. Hurst MC USN US Naval Hospital Great Lakes Illinois has been elected as a diplomate of the American Board of Otolaryngology Captain Federico

A. Zehrer MSC USA formerly at Letterman Army Hospital has been named to head the newly created office of educational services Army Medical Service School.

# The Medical Officer Writes

## Articles Published in Other Journals

### U S Army

- CENTRAL FOODSERVICE VESSEL DECEN R ED FOODSERVICE Major J C  
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### U S Navy

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C a l f A p a M d A u g u s t 1959

Titles for articles in current periodicals title by commissioned officer and civilian dentists in the medical  
services of the Department of Defense will be published herein insofar as space permits. This list is  
is gleaned from all bibliographies and is not necessarily complete. Author desiring inclusion for pub-  
lished article or in the second part to the Journal - E R

# This Is Your A M A

THE AMERICAN MEDICAL ASSOCIATION organized its Council on Industrial Health in 1931 but had taken an active interest in industrial health for at least a quarter century before that. As early as 1915 the Association Section on Preventive Medicine and Public Health had a Committee on Industrial Sanitation, and the Association's Judicial Council had prepared an extensive review of workmen's compensation laws and their medical implication.

The scope and activities of the Council on Industrial Health have been expanded considerably over the years to keep pace with advances in industrial medicine. The Council has recently been assigned primary responsibility within the Association for public medicine and has delegated this to its Committee on Public Medicine.

However, the Council is concerned principally with the multitudinous problems connected with the protection and improvement of the health of the working population. The Council advocates medical examinations and supervision of all workers to ensure suitable job placement. It encourages health maintenance through health education and counseling, periodic examination, and prevention and treatment of occupational illness and injury.

Other areas of interest and activity of the Council include workmen's compensation, rehabilitation, employment of the handicapped, union and hearings on supervision and investigation and control of all health hazards in industry and the promotion of cooperation in these areas among physicians, industrial hygienists and nurses. The Council promotes the teaching of occupational medicine at all levels of medical education and encourages and assists physicians in other fields of practice to learn more about the health of the worker in relation to his job.

The Council on Industrial Health serves as a source of information and guidance in all of the above as well as in the following areas: the organization, operation, staffing and the proper scope, objectives and functions of occupational health programs; the practice of occupational medicine and its relationships with management, labor and medicine in general; and the training, qualification, board certification, and employment opportunities in occupational medicine.

The Council carries out its work primarily with the advice and help of standing Committees and 11 Subcommittees. The standing Committees are Committee on Aviation Medicine, Committee on International Relations, Committee on Medical Education and Training, Committee on Public Services and Committee on Scientific Development. The subcommittees are Committee on Industrial Nursing, Committee on Mental Health in Industry, Committee on Industrial Health Emergencies, Committee on Medical Care for Industrial Workers, Committee on Workmen's Compensation, Committee on Occupational Cancer, Committee on Occupational Dermatoses, Committee on Industrial Ophthalmology, Committee on Industrial Medical Records, Committee on Neurological Disorders in Industry and Committee on the Personnel.

These committees have developed pamphlets in a large number of occupational health subjects. Sample copies of these pamphlets may be obtained free by writing to the Council on Industrial Health, American Medical Association, 535 North Dearborn Street, Chicago 10, Illinois. Among the titles are:

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From the Council: National Defense of the American Medical Association. The views and policies expressed are not necessarily those of the Department of Defense.—Eureka.

# The Medical Officer Writes

## Articles Published in Other Journals

### U S Army

CENT DFO S RYI E VER US DECE TRALIZED FOOD SERVICE M jor J C  
Lyd n AMSC USA M d g n Army H spt l T com Wa h: gt M l t y  
M d e A gu t 1959

GASTRO O AND E H SCOPY AN ANALYSE AND DISCUS OV OF 1752  
PROCEDURES C l l B H S l l J MC USA d Capta J E Myers  
J MC USA Walt R d A my H p tal M d c l A l f th D st t f  
C l mb Aug st 1959

U E OF SUCTION IN CONTROL O R U IV TED R DRAINING C VI  
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C l l C W Hugh MC USA nd Colo l W F B es MC USA  
Triple Army Ho p t l Ha a l M A l ch es f S g J Ju e 1959

CO GE IT L MIDGU V VU U CASE REFOR W T AUT Capt n W J  
W rw k MC USA a d C pta n S R Lea tt MC US\ DeWitt Army  
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SHOCK Capt H M W s Jr MC USA F t L ut n nt A T Knecht  
J CmlC USA PFC G S Beal USA nd PFC M Y ss USA Army  
Chem al C t Edg w d M y l d S g y September 1959

### U S Navy

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### U S Air Force

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# The Medical Officer Writes

## Articles Published in Other Journals

### U S Army

- CENTRALIZED FOOD SERVICE VERSUS DECENTRALIZED FOOD SERVICE Major J C Lydon AMSC USA Madigan Army Hospital Tacoma Washington Military Medicine August 1959
- GASTROSCOPY AND ENDOSCOPY: AN ANALYSIS AND DISCUSSION OF 145 PRIMER CLONIBESIDE Junior MC USA and Captain J E Myers Junior MC USA Walter Reed Army Hospital Medical Annals of the District of Columbia August 1959
- USE OF SURGICAL ANESTHESIA IN THE RESIDUAL INFECTED OR DRAINING CAVITIES TRAC AND FSTUDS Captain K Q Vandenberg USAF MC Leutenant Colonel C W Hughes MC USA and Captain W F Bowers MC USA Tripler Army Hospital Hawaii Medical Annals of the District of Columbia July 1959
- CONCENTRIC MIDGUT VOLVULUS CASE REPORT Lieutenant Captain W J Wawak MC USA and Captain S R Little MC USA DeWitt Army Hospital Fort Bliss Arizona Pediatrics August 1959
- OPERATION OF THE CARDIOPULMONARY SYSTEM IN THE TUBERCULOTIC STOCK CAPTAIN H M W Junior MC USA and Lieutenant A T Knott Jr CMJ USA PFC G S Bell USA and PFC M L Sasser USA Army Chemical Center Edgewood Maryland Surgery September 1959

### U S Navy

- THE RELIABILITY OF PAIN SYMPTOM IN DENTOPATHOLOGY Lieutenant N D Spence DC USNR US Naval Training Center San Diego California Naval Medicine and Dentistry September 1959
- CENTRIC VOLVULUS OF THE SMALL INTESTINE Captain G W Taylor MC USN Tripler Army Hospital Hawaii Medical Annals of the District of Columbia July 1959
- EXTENSIVE DYSOXYGENATION DURING TREATMENT OF BURNED PATIENTS USN Lieutenant J L Henn MC USN USN Tripler Army Hospital Bethel Alaska Medical Annals of the District of Columbia July 1959
- ELECTRIC COAGULATION OF ARTERIAL BURN Lesions Lieutenant H C Uhl Jr MC USNR and E J Roth MD Naval Medical Research Institute Bethesda Maryland Annals of Surgery August 1959

### U S Air Force

- HUMAN ASPECTS OF MARC LONP ECTION A F Ziller PhD USA Free Doctor of Flight Safety Research Note Air Force Base California Medicine August 1959

Titles of articles in this periodical are written by commissioned officers and civilian scientists in the services (with Department of Defense) will be published each month insofar as space permits. This listing is gleaned from all bibliographies and is not necessarily complete. Authors of articles in this journal are invited to send a copy of their article to the Editor.



## Correspondence

I think the redesigned cover and format is most apt to congratulate you as editor and your editorial staff and how you are doing

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I have been privileged to receive and read the Armed Forces Medical Journal for the past ten years. I have been extremely pleased with the betterment of the Journal. The quality of articles, both as well as the general format of the Journal. I would place the Armed Forces Medical Journal high on the list of recommended reading for Army and Reserve Officers but for any general practitioner on the occasion of the tenth anniversary of the reorganized United States Armed Forces Medical Journal publication. I wish to compliment you and the editorial board not only for having maintained the high quality but also for having instituted innovations that have made it valuable to its readers.

CHARLES J. JONES

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I note with pleasure the new format of the United States Armed Forces Medical Journal. This is in fitting anticipation of the tenth anniversary of this professional publication for the medical community. I could expound at length on the many fine features and of excellence of its content but I think it sufficient to say that the Journal has taken its place in the front ranks of the world.



## BOOK REVIEWS

physiologic principles related to injury and healing are presented with lucidity giving the reader a grasp of the metabolic response to injury unclouded by needless and confusing graphs. Whatever graphs and tables are employed are comfortably simple. Well elected roentgenograms are augmented by clear drawing which leave little doubt as to the points made. Anatomic drawings are good though rather sparse in some sections. Especially outstanding is the chapter dealing with injuries of the skull and brain. Precise recommendations for managing the patient with head injuries are given and this is the pattern throughout the book. Controversial discussions are kept to a minimum. The author states at the outset that this book was written not so much for the edification of other surgeons as for the innumerable medical students resident and practitioners who will not receive a complete training in surgery but who nevertheless will be called upon to cope with the great majority of all civilian accidents. He is too modest in his estimate of the scope of his audience. With the special attention giving today no one surgeon dealing with trauma can know all the answers and he will certainly be grateful for an authoritative practical and well written volume to help him channel his thinking with respect to the care of the severely injured patient. Any dogmatism present is inoffensive. This book should be readily available to all who treat trauma.

COMDR ROBERT H. BROWN, MC, USA

**THE YEAR BOOK OF DERMATOLOGY AND SYPHILOLOGY (1958-1959 Series)**  
 edited by *Rudolf L. Baer, MD* and *Victor H. Witten, MD*. Year Book Publishers, Inc. Chicago, Ill. 1959. Price \$8.50.

This annual volume contains abstracts of the articles the editors consider of most significance in the foreign and American dermatologic literature published between September 1957 and September 1958. Each abstract contains the author's name, the name of the facility in which the work was done and the journal in which the article was published. Following each abstract of series of similar abstracts there is a note of editorial opinion and experience on the subject. The articles are grouped under 14 sections, the first section being devoted to a review of benign pigmented lesions. The volume is well indexed and serves as a quick and ready reference for the busy dermatologist.

CAPT KARL V. KAES, MC, USA

**SURGERY OF THE COLON** by *E. D. R. Hughes, MD, MS (Melb), FRCS (Eng), FRACS*. 41 pages, illustrated. Williams & Wilkins Co. Baltimore, Md. 1953. Price \$1.50.

This book records the author's personal ideas and experience with diseases of the colon. Because it deals with the management of colonic diseases into medical and surgical categories, he includes a chapter on constipation and diarrhea in neither of which a surgical treatment is recommended. With Dr. Hirschprung's disease, a rare condition, indicated that for some time because of the author's lack of personal experience with the disease and the little because of the unique position it occupies. The volume is in the main orthodox as it well might be, but the are a number of interesting surgical and orthodoxy according to American standards. For example, a tubotic preparation of the bowel for surgery is viewed as a mild check of favor as the loss of blood in an amount of 1 unit on the table for the recovery of the patient because the increased blood volume thus obtained will increase surgical bleeding. Operative technique is mentioned as different from our method of suturing the general principle according

# US ARMED FORCES MEDICAL JOURNAL

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## BOOK REVIEWS

compared with older child *en* have already been recognized. Therefore the editor comments that until further data are available it might be well to note Dr Bodian's conservative approach. No patient has been denied the possible benefits of surgery and/or radiotherapy. This book should be of great value to anyone who deals with neoplastic diseases of children including pediatrician, pathologists, radiologists and surgeons.

COL CONN L MILBURN JR MC USA

**THAT THE PATIENT MAY KNOW An Atlas for Use by the Physician in Explaining to the Patient** by *Harry F Douling MD ScD* and *Tom Jones BFA* assisted by *Virginia Samter* 139 pages illustrated W B Saunders Co Philadelphia Pa 1959 Price \$7.50

If the saying "one good picture is worth a thousand words" is true then this book with its many excellent drawings should do much to preserve the medical larynx while improving the understanding of the patient. It is a systematized collection of anatomically accurate drawings of both normal structures and their lesions labeled in simple terms to be used by the physician in his discussion of a problem with his patient. Numerous schematic drawing of physiologic processes are presented to aid in the elaboration of metabolic, endocrine and psychologic factors in disease. It is doubtful however that a drawing of a throbbing foot will convey any additional information to one afflicted with the neuritis of vitamin deficiency or for that matter with any other ailment. Nor is such a loaded term as "shrieked" in the valvular heart disease action without hazard in the times of subliminal persuasion. Such objection of which I have mentioned to or of minor import and should not frustrate the mission of those who take the degree of doctor literally. Suggested drawings are available by area and disease by means of a good cross index. To many a busy practitioner this book may be a useful labor saving device yet it must be realized that a complex dynamic problem does not become simpler merely because an artifactual caricature of it has made it more easily transmitted to others.

LT COMDR ROBERT E DE FOREST MC USN

**MEDICINAL CHEMISTRY A Series of Reviews Prepared Under the Auspices of the Division of Medicinal Chemistry of the American Chemical Society** by *William J Doran F R Blicke* and *K H Cox* editor *L F Hulse* associate editor *Harriet Ceer* assistant editor Vol IV 334 p g John Wiley & Sons New York NY 1959 Price \$12.

The volume is principally devoted to tabular summary of barbituric acid derivatives (classified according to structure) and of the available pharmacologic data pertaining to the compound. The information is based upon all literature research that included over 100 references found in *Chemical Abstracts* (1907 through 1956) and in *Chemical Abstracts* (189 through 1944 except for the years 1940 and 1943) as well as review of more than 100 barbituric acid derivatives listed at the I G Farbenindustrie plant in Germany. A relatively short introductory chapter provides a survey of a little of information concerning the chemistry, pharmacology and clinical use of the barbituric acid derivatives. The chapter is followed by a series of tables of pharmacological action in tabular form. The tables are arranged in a logical sequence of pharmacological action and are divided into three main categories: (1) barbituric acid derivatives, (2) barbituric acid derivatives, and (3) barbituric acid derivatives. The tables are arranged in a logical sequence of pharmacological action and are divided into three main categories: (1) barbituric acid derivatives, (2) barbituric acid derivatives, and (3) barbituric acid derivatives.

# US ARMED FORCES MEDICAL JOURNAL

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## BOOK REVIEWS

**THE MEANING OF POISON** by *Lloyd C. Stevenson M.D.* 7th series Logan Clin- dening Lecture on the History and Philosophy of Medicine 33 pages University of Kansas Press Lawrence Kans. 1959 Price \$2

In the first of the two lectures Dr. Stevenson deals with the history of the various meanings given to the words *poison*, *contagion* and *injection*. The primitive idea of the poison of a plant, drug, serpent or even of a maiden was followed by such a term as our modern *blood poison* and by the concept of the toxins of contagious and infectious diseases. The second lecture traces the history of curare, the hellish oorah of Lord Tennyson from its place as a center of controversy over antivenereal action in the nineteenth century to its use as a research tool and adjunct of anesthesia at the present time. The little book is well bound and printed and has bibliographical notes and an index.

CAPT. LOUIS H. RODDIS MC USN (RET.)

**YEAR BOOK OF MEDICINE 1958-1959** Series edited by *Paul B. Beeson M.D.*, *Carl Muschenheim M.D.*, *William B. Castle M.D.*, *Tinsley R. Harrison M.D.*, *Fran J. Ingelfinger M.D.* and *Philip A. Bondy M.D.* 782 pages illustrated Year Book Publishers, Inc. Chicago Ill. 1958

This is a practical clinical volume on the newer trends as published and selected throughout the period indicated. Although advances in therapy have been rapid and tremendous, particularly with antimicrobial, hypotensive and steroid compounds, the authors have made a good selection of material. The sections on hematology and cardiovascular disease appear particularly comprehensive. The section on chest disease has two worthwhile articles on the pro and cons of BCG vaccination bringing one up to date in this field. It would seem that the index is more inclusive than in some of the previous editions. This is a quick reference for the busy clinician and resident.

BRIG. GEN. FRANCIS W. PRUITT MC USA

**PRINCIPLES OF DISABILITY EVALUATION** by *William C. Thorn Smith M.D.* 210 pages J. B. Lippincott Co. Philadelphia Pa. 1959 Price \$7

This book on the evaluation of physical disability provides a reference for physicians in industrial medical practice and appears to be of limited usefulness to others in the practice of medicine. It is published in large, easily read type with the contents divided into titled sections, subsections and paragraphs. The book contains an excellent discussion of the medical, witness, expert medical testimony and courtroom department. The author, the chief medical advisor to the Oregon Industrial Accident Commission and the text repeatedly refers to the statutes of the State of Oregon and urges the reader to familiarize himself with the laws and directive governing industrial disability evaluation and compensation in his own state. The author states that as a result of the marked lack of uniformity in industrial disability evaluation and compensation in the United States, many generalizations in the text are necessary. The text is replete with definitions of terms frequently used and is understood in industrial medical practice. It occasionally becomes too wordy especially when exploring the philosophy and history of disability evaluation. An excellent section is printed on examination of physical condition of physical findings with job requirements and other factors. The book is well organized and contains a cross-reference index to make it more easily used.

LT. COL. FREDERICK S. SPILCEL, USAF MC

# US ARMED FORCES MEDICAL JOURNAL

THE PRACTICAL EVALUATION OF SURGICAL HEART DISEASE. The Gloucester Clinic  
 Written and compiled by R. B. L. G. T. L. M. D. D. T. D. L. Y. R. B. L. G. L. M. D.  
 J. Ph. S. Medical Illustrations. He is dedicated by J. S. H. B. H.  
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PT W R J HUYCKE MC A



# BOOK REVIEWS

DIABETIC MANUAL, by Eliot P. Joslin M.D. and J. M. Rosenfeld M.D. 1-1959 illustrated Lea & Feb. Philadelphia Pa. 300 pp. \$5.00

This continues to be the outstanding manual in diabetes. It is written in language any reader can understand. It is a must for all diabetic patient. The part of a Dr. in the management of the diabetic permeate every page. All these chapters are well illustrated in this book. Diet exercise physical therapy and the use of insulin are explained thoroughly and the use of the various types of hypoglycemic drugs are discussed in a well rounded manner. The book Dr. Joslin's patients will give hope to those suffering from the disease. It is highly recommended for all the family doctor especially for the cases and at least one reading would also be of use to the nurse who cares for diabetic cases.

CAPT. EDWARD F. MC LARNEY MC USA

MECHANISMS OF HYPERSENSITIVITY Henry Ford Hospital International Symposium edited by Joseph H. Saefer M.D. Gerald A. LeGrippe M.D. and Merrill W. Chase Ph.D. 304 pages illustrated Little Brown & Co. Boston Mass. 1959 Price \$18.00

This tremendous undertaking is a record of an international symposium sponsored in March 1958 by the Henry Ford Hospital in Detroit Michigan. The material has been compiled and presented by 60 specialists from the United States Canada and several European countries with the cooperation of 400 investigators in the field of allergy dermatology immunology and allied sciences. The book is especially well organized and produced on fine-grade paper with excellent illustrations. The subjects are arranged into 12 major topics with discussion of each chapter by authorities in the representative fields. A detailed list of references also follows each chapter. The authors point out that antibodies cannot be divided into broad general classes on the basis of reaction with antigens because all antibodies can agglutinate precipitate and hemolyze. Some new hemagglutination methods for demonstration of antibodies in sera of ragweed sensitive persons are described namely coupling of ragweed pollen constituents to rabbit red blood cells by stable covalent azo bonds and aggregation of sensitized erythrocytes by antibodies in allergic sera. The ideal antibody test should be able to detect specific antibodies in very small amounts measure primary interaction of antibody and antigen and not be dependent on a secondary reaction. It should provide quantitative data and avidity and biologic properties such as precipitating nonprecipitating and skin sensitizing. It should apply to any antibody antigen system and be simple to perform. This ideal has not yet been reached. By electron microscopy red blood cells in hypersensitive states appear to change from the normally smooth surface to cones and umbilicated plateaus. This reaction has also been demonstrated in certain autoimmune diseases such as acquired hemolytic anemia erythroblastosis fetalis and anti A and anti Rh antibody reactions. Vascular spasm in pulmonary vessels is often considered the predominant factor in anaphylactic reactions but it has been demonstrated in rabbits that the pulmonary capillaries are distended with eosinophilic or antigen antibody precipitates and thrombi. These thrombi are also seen in renal glomeruli splenic sinusoids and some of the terminal portal veins of the liver. The book closes with a banquet speech entitled 'Are We Too Trigger happy?' by A. Ashley Miles M.D. of London a philosophic and yet rather amusing and I believe important speech. This research-oriented work has excellent reference value for the clinician and laboratory officer as well as for the basic scientist.

C. L. C. R. MEXICAN GAS MC USA

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